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Implementation of hazard analysis and critical control point (HACCP) system in a food service unit serving immuno-suppressed patient diets.

Mini-Dissertation submitted for the degree Magister Scientiae in Dietetics at the North-West University, Potchefstroom

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Abbreviations

ANC	Absolute Neutrophil Count
BMT	Bone Marrow Transplantation
CCP	Critical Control Points
CFP	Conference for Food Protection
CL	Critical limit
CM	Catering Manager
cm²	Square centimetres
CSF	Colony stimulating factor
FDA	Food and Drug Administration
GVHD	Graft <i>versus</i> Host Disease
GI	Gastro Intestinal
HACCP	Hazard Analysis and Critical Control Point Principles
HDCT	High Dose Chemotherapy
HIV	Human Immunodeficiency Virus
HLA	Human Lymphocyte Antigen
HSCT	Hematopoietic Stem Cell Transplant
ICU	Intensive Care Unit
ISO	International Organization for Standardization
IMM	Immunosuppressed Patient Diet
LBD	Low Bacterial Diet
ML	Milliliters
MMWR	Morbidity and Mortality Weekly Report
NASA	National Aeronautics and Space Administration
SABS	South African Bureau of Standards
PTY	Proprietary Limited
SANAS	South African National Accreditation System
SGS	<i>Societe Generale de Surveillance</i> Group
SIADH	Syndrome of Inappropriate Antidiuretic Hormone
U.S	United States
VOD	Veno-occlusive Disease

Abstract

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Objectives: Firstly, to investigate the current food safety and hygiene status in a hospital food service unit, serving low bacterial diets, by means of a questionnaire and bacterial swabs taken from the food service unit. Secondly, to utilize the gathered information in a structured action plan to implement HACCP standards successfully in the appointed food service unit. The implementation of HACCP will not be done by the author.

Design: The primary research was done in a food service unit of a 350 bed private hospital. One unsuspected audit with a pre-designed audit form was done. The audit consisted out of ten categories. A percentage was allocated to each category. Four swabs, as well as four food samples, were taken during the audit. The swabs and samples were tested to assess the microbiological safety of the foods prepared in the appointed hospital food service unit. The results of the audit, swabs and food samples were used to evaluate the current Food and Safety System of the hospital food service unit according to internationally approved HACCP standards.

Setting: The study was conducted in the metropolitan area of Gauteng, South Africa.

Abstract

Implementation of hazard analysis and critical control point (HACCP) system in a food service unit serving immuno-suppressed patient diets

Main aim: To supply recommendations to implement a Hazard Analysis of Critical Control Points (HACCP) system in a hospital food service unit serving low bacterial diets in order to prevent or decrease the infection rates in Hematopoietic Stem Cell Transplant (HSCT) patients.

Objectives: Firstly, to investigate the current food safety and hygiene status in a hospital food service unit, serving low bacterial diets, by means of a questionnaire and bacterial swabs taken from the food service unit. Secondly, to utilize the gathered information in a structured action plan to implement HACCP standards successfully in the appointed food service unit. The implementation of HACCP will not be done by the author.

Design: The primary research was done in a food service unit of a 350 bed private hospital. One unsuspected audit with a pre-designed audit form was done. The audit consisted out of ten categories. A percentage was allocated to each category. Four swabs, as well as four food samples, were taken during the audit. The swabs and samples were tested to assess the microbiological safety of the foods prepared in the appointed hospital food service unit. The results of the audit, swabs and food samples were used to evaluate the current Food and Safety System of the hospital food service unit according to internationally approved HACCP standards.

Setting: The study was conducted in the metropolitan area of Gauteng, South Africa.

Results: None of the ten areas audited was of an acceptable standard and an average of 37% was scored. Category 5, the service and distribution area, scored the highest (69%) and category 10, the quality procedures and records division, scored the lowest (6%). According to United States Food and Drug Administration Baseline Report five forbidden policies could lead to increased risk of food borne illnesses. All five forbidden policies were detected in the food service unit during the audit. The microbiological tests showed relatively high microbial counts.

Conclusion: The results of the study confirmed that instead of focusing mainly on the selection of food items allowed, and the cooking methods used in HSCT diets, the type of food service, together with the food and safety protocol that the food service follows, could play an important role in providing food that is safe for HSCT patient use.

Keywords: HACCP, bone marrow transplant, HSCT, neutropenic, cancer, hospital food service unit, hygiene, food safety, food borne illness

Opsomming

Die implementering van 'n GAKKP-sisteem ('HACCP') in 'n privaat hospitaal se voedseldienseenheid wat lae bakteriële diete aan Hematopoeietiese Stamselpasiënte verskaf.

Motivering: Om aanbevelings te verskaf vir die implementering van 'n 'HACCP' sisteem in 'n hospitaalvoedseldienseenheid wat lae bakteriële diete aan Hematopoeietiese Stamselpasiënte verskaf met die doel om infeksierisiko te verminder of totaal te voorkom.

Doel: Eerstens om die huidige voedselhigiëne en veiligheidssisteem in die voedseldienseenheid wat lae bakteriële diete verskaf te evalueer. Dit is gedoen deur middel van kombuisinspeksie en mikroskopiese ontleding van voedselmonsters en oppervlakdeppers. Tweedens is die informasie gebruik om 'n gestruktureerde aksieplan saam te stel met die doel om 'HACCP' in die voedseldienseenheid te implementeer. Die artikelskrywer is nie verantwoordelik vir die implementasie van 'HACCP' nie.

Ontwerp: Die kernondersoek is in 'n 350 bed privaat hospitaal se voedseldienseenheid geloots. Die artikelskrywer het een onverwagse inspeksie met vooraf ontwerpte inspeksievorm geloots. Die inspeksie het uit tien afdelings bestaan. 'n Persentasie is toegeken aan elke afdeling. Vier voedselmonsters en vier oppervlakdeppers is gedurende die inspeksie in die kombuisarea geneem. Die voedselmonsters en oppervlakdeppers het mikrobiologiese toetse ondergaan om die veiligheid en higiëne van perseel en personeel wat voedsel voorberei te bepaal. Mikrobiologiese uitslae en inspeksieverslagresultate is gebruik om die huidige Voedsel en Veiligheidssisteem in die voedseldienseenheid te evalueer volgens international goedgekeurde 'HACCP' standaarde.

Resultate: Nie een van die tien areas wat geïnspekteer is het voldoen aan die 'HACCP' standaard nie. Afdeling 5, die bediens en verspreidingsarea het die hoogste persentasie van 69% behaal. Die kwaliteitsprosedure en rekordarea, afdeling 10, het 6% behaal wat die laagste persentasie was. Volgens die Verenigde State van Amerika se Voedsel en Medikasie Administrasieverslag is daar vyf verbode praktyke wat die risiko om voedselvergiftiging te kry kan bevorder. Al vyf verbode praktyke was teenwoordig in die voedseldienseenheid. Die mikrobiologiese toetse het ook relatief hoë mikrobiële tellings gerapporteer.

Gevolgtrekking: Die resultate van die studie het bevestig dat die tipe voedseldienseenheid asook die Veiligheid en Higiëne stelsel wat die voedseldienseenheid gebruik 'n groot rol kan speel in die veiligheid van die voedsel wat aan hematopoeitiese stamspasiente verskaf word.

Sleutelwoorde: HACCP, beenmurgoorplanting, HSCT, neutropenies, kanker, voedseldienseenheid, voedselveiligheid, voedselverwante infeksie, voedselvergiftiging

1.1. Aim and objectives

The aim and objectives of this dissertation were:

Main aim:

To supply recommendations to implement a Hazard Analysis of Critical Control Points (HACCP) system in a hospital food service unit serving low bacterial diets, in order to prevent or decrease the infection rates in immuno-suppressed patients.

Objectives:

- To investigate the current food safety and hygiene status in a hospital food service unit serving immuno-suppressed diets by means of a questionnaire and bacterial swabs taken from the food service unit.
- To utilize the gathered information in a structured action plan to implement HACCP standards successfully in the food service unit.

1.2. Structure of this dissertation

This dissertation is presented in article format. The experimental work consists of one audit. The audit or preliminary study will be done by the author. The results will be used to compile a detailed action plan to implement HACCP in the hospital kitchen. The implementation of HACCP will not be done by the author.

Following this preface chapter, Chapter 2 provides background information necessary for the interpretation of the data in the article.

An overview of the history and background of HACCP, as well as the advantages of HACCP are given. The nutritional implications of marrow and

stem cell transplantation, as well as the different dietary recommendations will be discussed. In conclusion the article will investigate the benefits of implementing HACCP in a kitchen unit serving low bacterial diets. The implementation process and maintenance of such a HACCP system will also be discussed.

1.3. Authors' contributions

The study reported in this dissertation was planned by a team of researchers. The role of each of the researchers is given in the table hereunder. Also included in this section is a statement from the co-authors confirming their individual roles in the study and giving their permission that the article may form part of this dissertation.

Name	Role in the study
Mrs. EE Vermeulen (Hons B.Sc)	Responsible for literature searches, statistical analysis and writing up of the data. First author of the paper.
Dr SM Hanekom (PhD Nutrition)	Supervisor of MSc dissertation. Involved in statistical analysis and writing of paper.
Prof W Oldewage-Theron (PhD)	Assistant supervisor. Critically revised paper.

I declare that I have approved the above mentioned article, that my role in the study, as indicated above, is representative of my actual contribution and that I hereby give my consent that it may be published as part of the MSc. dissertation of Mrs. EE Vermeulen.

_____ *SM Hanekom*

Dr SM Hanekom

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2.1. Introduction

Due to the substantial suppression of the immune system following bone marrow transplantation (BMT), persons who receive bone marrow transplants are at higher risk of developing life-threatening infections (French *et al.*, 2001:1194).

A very strict low bacterial diet (LBD), which is intended to reduce the ingestion of bacterial and fungal contaminants, is given to these patients. The LBD is also known as a neutropenic diet, a reduced bacteria diet or the more liberated Hematopoietic stem cell transplant (HSCT) diet or Immunosuppressed Patient Diet (IMM) (Todd *et al.*, 1999:205).

This review will investigate the different dietary recommendations as well as the positive implications of implementing a HACCP system in a kitchen unit serving LBD diets.

2.2. Hazard Analysis and Critical Control Points (HACCP)**2.2.1. History and background of HACCP**

HACCP has become synonymous with food safety. HACCP is a system of "best practices" from which all food service operations could benefit. The National Advisory Committee on Microbiological Criteria for Foods defined HACCP as a management system in which food safety is addressed through the analysis and control of biological, chemical and physical hazards from raw

material production, procurement and handling, to manufacturing, distribution and consumption of the finished product (Strohbehn *et al.* 2004:1693).

The HACCP system for managing food safety concerns originated from two major developments. The first breakthrough was by Dr W.E Deming whose theories of quality management led to a quality increase in Japanese products in the 1950s. This led to the development of total quality management systems which emphasised a total systems approach to manufacturing that could improve quality, as well as lower production costs. The second breakthrough was the development of the HACCP concept itself (FAO, 1998: Section 3).

The term HACCP was first used in the 1960s by Pillsbury Company in cooperation with National Aeronautics and Space Administration (NASA) and the United States of America (U.S.A) armed forces to develop food for a space programme (Bolat, 2002:338). The Soviets put a satellite, known as "Sputnik" into space. The Americans decided to initiate a space programme to beat the Soviets to the moon. A programme was developed where efforts were made in all phases of the programme to minimize the chances of failure. This included food for the astronauts. As a result, a high priority was placed on conducting hazard analysis of ingredients and processes. Critical operations were identified and monitored. Whenever control criteria were not met, correction of product segregation and rejection occurred. These activities were verified to ensure that control was effective. This was the start of the HACCP approach to food safety (Bryan, 1999:9).

At the same time there was dissatisfaction with the *status quo* of food sanitation/hygiene/protection and safety programmes. To address these issues the first National Congress on Food Protection (CFP) was held in Denver in 1971. The HACCP approach was presented at this congress (Riswadkar 2000:34).

After its general introduction in 1971, the main applications of the system were microbiological hazards. It has been used since 1973 in auditing establishments producing low-acid preserved food. At the beginning of the 1980s HACCP was adopted by large businesses (Bolat, 2002:338). Youn and Sneed (2003:55) recommended the implementation of HACCP programmes to provide safe food and to prevent food borne illness outbreaks.

2.2.2 Advantages of HACCP

According to a review by Bolat (2002:340) the HACCP system could have a significant impact on the production management in fast food businesses, since it:

- provides a general system to ensure food safety,
- helps to put microbiological, chemical, and physical hazards under control,
- presents standards and common terminology for production processes, control procedures and documentation as a guide for fast food businesses, thus setting a standard for conducting audits,
- makes it possible to measure the performance of the business using safe food production as evaluation criteria,
- provides a detailed plan of all the processes, from supply of raw materials and food ingredients to delivery of end products to customers. This is a pro-active, rather than a re-active approach,
- reduces customers' complaints and increases their satisfaction,
- is much cheaper and safer than systems in which the businesses are subject to end stage quality testing,
- improves food production by required documentation and monitoring,

- requires regular personnel training, encouraging personnel awareness and care necessary for food safety,
- is easily understandable and flexible, and
- can be performed together with other quality studies such as end product testing, and sets a certain standard as different branches could compare themselves to one another.

Full participation, however, of all the employees from every department in an institution is required for the implementation of a HACCP system. In this way HACCP could play a positive role in motivating employees and improving relationships in the company (Bolat, 2002:340).

In a study by Eves and Dervisi (2005:14) at seven food service outlets in the South East of England, most of the employees at a newly implemented HACCP food service unit felt that the system was helpful. It identified hazards in their operation, they had become more aware of them and how they could be controlled. They also felt protected as they could prove that they had taken all reasonable precautions in their operations. Manuals, indicating where hazards could occur, were helpful and useful in transmitting information down the line. Inspection procedures (by either external or internal assessors) were also easier and more complete, because the policies were clear and conformance with them was expected.

In conclusion; the HACCP concept is rational because it is based on historical data on causes of illness.

- It focuses attention on critical operations where control is essential.
- It is comprehensive because it focuses on ingredients, processes and end products.
- It is continuous because problems are detected as they occur and corrective actions are taken at that time.
- It is systematic because it covers step-by-step operations.

These attributes give a high degree of assurance that the end products in a properly designed, well-maintained HACCP system pose a low risk of food borne illness (Bryan, 1999:14).

2.3 The HACCP system

Undergraduate dietetic students are taught to make clinical decisions based on scientific data, and not personal preference or anecdotes. This was generally accepted in the nutrition and clinical arenas, but not often stressed in the practice of food service management. However, implementation of HACCP in a food service unit is also enhanced if a manager has scientific background on which to base decisions (McClusky, 2004:1699).

The overall goals of a HACCP programme are twofold: to ensure the safety of food and nutrition products and to create a process for corrective action and continuous improvement (Stamey, 2006:48).

With HACCP in place, a food handler can identify and monitor specific food borne hazards that are biological, chemical or physical in nature. It focuses on identifying and preventing hazards that could cause food borne illnesses, rather than relying on spot checks of manufacturing processes and random sampling of finished products to ensure safety (Raswidkar, 2000:33).

The important fact to understand is that HACCP is not an extra group of tasks done in addition to the current workload. It is a management system that replaces the current system (McClusky, 2004:1699).

2.4 Hematopoietic Stem Cell Transplants

Hematopoietic Stem Cell Transplant (HSCT) is the infusion of hematopoietic stem cells from a donor to a patient who has received chemotherapy, which is

usually marrow-ablative. The basic concept of HSCTs underpins the regimes of dose intensity. Higher doses of radiotherapy and/or chemotherapy may be given than would otherwise be possible (Foster, 2005:2).

According to Parrish (2005:84) more than 40 000 HSCTs are performed world-wide each year. HSCT has been used to treat neoplastic diseases, hematologic disorders, immunodeficiency syndromes, congenital enzyme deficiencies and autoimmune disorders like lupus erythematosus or multiple sclerosis.

HSCT is largely divided into three types: (i) allogeneic transplants; (ii) autologous transplants; and (iii) syngeneic transplants (Foster, 2005:2).

Cells used in allogeneic HSCTs are harvested from a donor other than the transplant recipient. Such transplants are the most effective treatment for persons with severe aplastic anemia and offer the only curative treatment for a person with chronic myelogenous leukemia. Allogeneic donors may be a blood-relative or an unrelated donor. Allogeneic transplants are usually more successful when the donor is a human lymphocyte antigen (HLA) – identical twin or matched sibling (Parrish, 2005:85).

The patient's own cells are used in an autologous HSCT. Autologous HSCTs are preferred for patients who require high-level or marrow-ablative chemotherapy to eradicate an underlying malignancy, but have healthy, undiseased bone marrows. Autologous HSCTs are used most frequently to treat breast cancer, non-Hodgkin's lymphoma and Hodgkin's disease (Foster, 2005:2).

Syngeneic transplants are reliant upon the recipient having an identical twin as a donor and this type of HSCT occurs to a lesser degree (Foster, 2005:2).

2.4.1 The transplantation process

Once a donor has been identified, the actual transplantation procedure begins. It consists of three phases: preparation for the transplant, transplant and management after the transplant (McCallum, 2003:57).

2.4.1.1 Preparation for transplant

High doses of chemotherapy with or without radiation therapy are delivered to the recipient to achieve two goals, namely the destruction of malignant or dysfunctional cells and the degradation of the immune system to a sufficient degree to avoid rejection of the allograft by residual, immunological active cells in the host (Fauci *et al.*, 1998; 725).

2.4.1.2 The transplantation procedure

Collection of the bone marrow from a donor is referred to as harvesting. Marrow is usually harvested by repeated aspiration from the posterior iliac crest until an adequate number of cells have been removed.

If peripheral blood stem cells are being harvested, the donor may receive a colony stimulating factor (CSF) to augment the number of circulating stem cells and will then undergo repetitive apheresis procedures lasting several hours on consecutive days. The procedure is usually accomplished on an outpatient-basis, and donors usually return promptly to their usual activities, requiring only oral analgesia.

Marrow is sometimes treated *in vitro* to remove unwanted cells before being administered to the patient (McCallum, 2003:56; Fauci *et al.*, 1998:634).

2.4.1.3 Management after transplant

All patients undergoing BMT require intense supportive care between the time of the hematopoietic progenitor cells infusion and when they are able to produce adequate numbers of granulocytes, platelets and erythrocytes. Early after the transplant, therapy is focused on prophylaxis against infection, bleeding and *graft-versus-host* disease. Beyond careful HLA matching, a combination of methotrexate, cyclosporine and prednisone appears to be the most effective prophylactic drug regimen. In addition, supportive care usually includes blood component infusions as needed to keep the platelet and hemoglobin count at safe levels, protective isolation and broad spectrum antibiotics. The average time to recovery of granulocyte counts greater than 500/ μ L, is 10 to 20 days (Parrish, 2005:89).

2.5 Side effects and complications from HSCT

2.5.1 Neutropenia

A potential side-effect of chemotherapy is severe neutropenia, the major risk for sepsis. When the absolute neutrophil count (ANC) is less than $500 \times 10^9/\ell$, there is a marked rise in infection risk, with the maximum risk occurring after prolonged, profound neutropenia (Moody *et al.*, 2002:717).

Organisms that colonize the neutropenic host frequently cause infections. In an effort to reduce the risk of sepsis during periods of neutropenia, the patients are kept in isolation rooms and they receive a special low bacterial diet popularly referred to as the neutropenic diet or HSCT diet (Moody *et al.*, 2002:717).

2.5.2 Nutritional issues and other side effects in patients with severe neutropenia

Nutritional complications are commonly experienced by patients with severe neutropenia. The extent to which nutritional issues are experienced depends on a number of factors with the degree and duration of neutropenia being the most important factor.

Malnutrition is a common result of both disease and high dose chemotherapy (HDCT). Early intervention to prevent weight loss is a primary goal. Severe neutropenic patients require extensive nutritional support before, during and after the bone marrow transplant.

Gastrointestinal (GI) problems may arise because of mucosal injury (Nitenburg & Raynard, 2000:153). In contrast to standard dose chemotherapy, HDCT typically causes GI complications that are more severe and of longer duration (table 2.1.).

The incidence and intensity of GI toxicity is dependent on the treatment regime and host response. The combined effects of HDCT and, in the case of a transplant, the use of total body irradiation produce extensive tissue and organ damage (Rust *et. al.*, 2000:152). This could lead to severe emetic episodes with persistent nausea and anorexia; mucositis, xerostomia, esophagitis and dysphagia; and diarrhoea with abdominal cramping as well as heartburn (Rust *et. al.*, 2000:153). These complications could lead to severe weight loss.

In allografting where matched unrelated donors are used, severe graft versus host (GVHD) disease could lead to further complications where organs such as the liver and gastrointestinal tract is involved. When these organs are affected, clinical symptoms, physiological abnormalities and catabolic steroid

therapy can cause weight loss, hypoalbuminemia, vitamin, mineral and trace element deficiencies, bone loss and muscle wasting (Stern, 2002:1812).

A summary of side-effects that may occur in the first few weeks post transplant include the following:

- Mucositis
- Candidiasis
- Esophagitis
- Diarrhoea
- Nausea
- Vomiting
- Anorexia
- Early satiety
- Immuno-suppression/bacterial -, viral -, and fungal infection
- Veno-occlusive liver disease
- Drug induced liver damage
- Extreme fatigue
- Bleeding
- Fever
- Respiratory complications
- Renal failure
- Cardiac complications
- Haemorrhagic cystitis

(McCallum, 2003:58)

TABLE 2.1 Major Non-Hematologic Toxicities for Selected Chemotherapy Agents Commonly Used for High Dose Therapy (Rust *et al.*, 2000:154).

Chemotherapeutic Agent	Major Organ Toxicities	Nutritional Related Toxicities
Busulfan	Gastrointestinal, hepatic, pulmonary	Nausea, vomiting, moderate to severe mucositis and diarrhoea
Carmustine	Gastrointestinal, pulmonary, hepatic	Nausea/Vomiting
Cyclophosphamide	Gastrointestinal, genitourinary, cardiac	Nausea/Vomiting, *SIADH
Cytarabine	Gastrointestinal, hepatic, genitourinary, neurological	Nausea/Vomiting, diarrhoea, mucositis
Daunorubicin	Cardiovascular, gastrointestinal, hepatic, neurological, dermatological	Nausea/Vomiting, diarrhoea, mucositis, metallic taste
Etoposide	Gastrointestinal	Nausea/Vomiting, severe mucositis, diarrhoea, and abdominal pain with higher doses
Melphalan	Gastrointestinal	Nausea/Vomiting, mucositis with higher doses

**SIADH: syndrome of inappropriate antidiuretic hormone.*

Other side-effects that may occur within the first three months after the transplant include the following:

- ◊ Biliary disease
- ◊ Viral hepatitis
- ◊ Acute graft versus host disease (GVHD)
- ◊ Bone damage
- ◊ Respiratory complications

(McCallum, 2003:58)

2.6 History of different diets served to HSCT patients

Infection is a leading cause of death among cancer patients (Todd *et al.*, 1999; 205).

One of the serious side-effects of chemotherapy is the development of neutropenia which greatly increases the risk of infection. A normal ANC is greater than or equal to $2-7 \times 10^9/\text{litre}$. Neutropenia has an ANC of less than $2 \times 10^9/\text{litre}$. The healthcare associated infection rate has been reported to be at least 40% with neutropenic patients.

Infection or sepsis could be lethal to these patients, approximately 70% - 75% of the deaths from acute leukemia and 50% of deaths in patients with solid tumors are related to infection secondary to neutropenia (Larson & Nirenberg, 2004:718).

The HSCT diet evolved from sterile diets of autoclaved and irradiated foods used in the context of germ-free environments in the 1960s. Sterile diets were unpalatable to the patients (Moody *et al.*, 2002:717), expensive to manufacture and not widely available for hospital use.

New "cooked food" diet guidelines were compiled by The National Institutes of Health and The Department of Dietary and Environmental Sanitation of the USA in the 1970s. The National Cancer Institute in Maryland, America used this diet, containing thoroughly cooked foods, autoclaved milk and sterile water and ice, which was prepared in the Clinical Centre or Laminar Flow Kitchen (table 2.2).

TABLE 2.2 National Cancer Institute "cooked food diet"* (Pizzo et al., 1982:272)

<i>Roast pork tenderloin</i>	<i>grilled pork chop</i>
<i>roast lamb</i>	<i>Swedish meatballs</i>
<i>London broil</i>	<i>chili</i>
<i>roast beef</i>	<i>fried fish</i>
<i>corned beef</i>	<i>Swiss steak</i>
<i>pork barbeque</i>	<i>fillet of sole</i>
<i>braised lamb cubes</i>	<i>corned beef hash</i>
<i>fried chicken</i>	<i>baked macaroni and cheese</i>
<i>baked tuna and noodles</i>	<i>stuffed green pepper</i>
	<i>chicken chow mein</i>
<i>turkey cacciatore</i>	<i>Spanish rice</i>
<i>mashed potatoes</i>	<i>corn chowder</i>
<i>baked potatoes</i>	<i>minestrone</i>
<i>diced potatoes</i>	<i>Manhattan clam chowder</i>
<i>oven browned potatoes</i>	<i>Cream of turkey soup</i>
<i>franconia potatoes</i>	<i>Split pea soup</i>
<i>French fried onion rings</i>	<i>Beef noodle soup</i>
<i>Lima beans</i>	<i>Buttermilk biscuit</i>
<i>cream gravy</i>	
<i>corn fritters</i>	<i>Fruit cocktail</i>
<i>applesauce</i>	<i>Baked apple</i>
<i>oatmeal cookies</i>	<i>Stewed prunes</i>
<i>peanut butter cookies</i>	<i>Apple pie</i>
<i>pound cake</i>	
<i>angel food cake</i>	
Items prepared in Laminar Flow kitchen	
<i>grilled cheese sandwich</i>	<i>French toast</i>
<i>plain egg omelet</i>	<i>Citroen float</i>
*Each item was tested at least three times and had fewer than 500 colony-forming units per gram or cubic centimeter on each testing	

All the food was cooked in the central kitchen of the Clinical Centre and delivered to the Laminar Flow Kitchen in clean, sealed containers for distribution or was prepared directly in the Laminar Flow Kitchen. Beverages, such as fruit flavoured drinks, iced tea and lemonade, were autoclaved. Foods produced and wrapped by manufacturers, such as bread, crackers and plain biscuits were issued to the Laminar Flow Kitchen in unopened units. Individual containers of canned fruit, fruit juice and carbonated beverages

were dipped into solutions of povidone-iodine and alcohol before being opened. All food and beverages were served from the Laminar Flow Kitchen on a double wrapped sterile tray, with sterilized dishes, glasses and utensils. All items were tested at least three times before being included in the "cooked food diet" to ensure that they met the microbiological acceptability requirements (Pizzo *et al.*, 1982:272).

Although the "cooked food diet" was more acceptable to patients than the sterile diet, patients who had been on this diet for longer than 4 to 6 weeks often became frustrated with the limited food selection (Moody *et al.*, 2002:717).

In 1982, Pizzo *et.al.* (Infectious Disease Section at the National Cancer Institute of Bethesda, Maryland) was commissioned to develop a nutritionally balanced cooked diet that will be used in a protected environment (PE) for patients at increased risk for life-threatening infections, for example, patients with severe immuno-deficiency diseases, with bone marrow failure states or following intensive chemotherapy for a malignancy (Pizzo *et. al.*, 1982; 272).

The objectives were to find products or menu options that were microbiologically safe, readily available, easily stored and prepared and acceptable to patients with diversified dietary preferences. The food items selected to be tested were chosen by the institutional patients and were not on the current cooked diet menu. Food products and/or beverages were considered safe for patient consumption when microbiological cultures yielded less than 500 *Bacillus* species per gram or cubic centimetre. The growth of most other organisms (regardless of the colony count) generally resulted in rejection of the tested product. In selected instances the finding of *Staphylococcus epidermidis* or *lactobacilli* in colony counts of less than 500 per gram or cubic centimetre was permitted (Pizzo *et.al.*, 1982:274).

Two hundred and thirty-six food items were tested. Microbiological testing revealed that approximately 66% of the food products satisfied the relatively stringent criteria for microbiological acceptability. Virtually all the bread and beverages products tested were considered safe. Intermediate categories for acceptability included 70% of canned food products, 67% of cereal products, 77% of dairy products, 67% of frozen products, 66% of snack foods and 76% of spices and seasonings. Only 20% of the processed meat and 30% of fresh fruit and vegetables tested, met the microbial criterion for acceptability (Moody *et al.*, 2002:717). Nonetheless, the simple cleansing of skins of certain fruits permitted the option of serving some fresh fruits to isolated patients (Pizzo *et al.*, 1982:275).

This liberalised diet became known as the low-bacterial diet (LBD) or the neutropenic diet (Moody *et al.*, 2002:717).

The Seattle Cancer Care Alliance followed a LBD diet until 1994. In 1994 they liberalised the diet for HSCT patient to the Immuno-suppressed patient diet (IMM). The IMM Diet was structured according to American Society of Blood and Marrow Transplantation Morbidity and Mortality Weekly Report (MMWR) Recommendations and Reports, "Guidelines for Preventing Opportunistic Infections among Hematopoietic Stem Cell Transplant Recipients, Recommendations of Centers for Disease Control and Prevention (CDC) as well as the Infectious Disease Society of America, and the American Society of Blood and Marrow Transplantation" (MMWR, 2004:1). The IMM diet is prepared in the same way as all the other hospital diets. Normal china crockery and a regular dishwashing system is used. Food is assembled on the tray line (open air is fine) and if delivered in a food cart, no additional wrappings or coverage is required.

In addition to protecting the patient from food-borne illness and fungal organisms, the IMM diet is designed to allow a wide variety of nutritious and

conventional foods. This is important to promote resumption and oral intake in patients having difficulty ingesting food post transplant due to transplant complications. A major focus of the diet, which is different from the LBD diet, is the restriction of foods which may be a source of fungal and mould organisms. For these HSCT patients, fungal infections continue to be the major morbidity and mortality risk compared to the more treatable bacterial infections (Addendum E)

The IMM diet is prescribed for in-patients as well as out-patients. The HSCT patient, regardless of environment and time post transplant, is at risk for food-borne illnesses. The key to the success of the IMM diet is that it should be followed regardless of the environment the patient may be in (hospital, clinic or home). Autologous stem cell transplant patients, which received their own stem cells, need to follow the diet for three months post -HSCT.

Allogeneic patients, who received stem cells from a donor, need to follow IMM for as long as they are being treated with immuno-suppressive drugs, like prednisone.

2.6.1 Evidence for the use of LBD

As mentioned earlier, infection is a leading cause of death among all cancer patients. Normally the LBD is used when a patient becomes neutropenic. Common sites of infection during neutropenia include catheter sites, the lungs and the gastro intestinal (GI) tract (Rust *et al.*, 2000:153).

Food is one of the most common vehicles for bacterial transmission, especially of many potentially pathogenic organisms that are not part of the normal flora of the gastrointestinal flora and tract (Todd *et al.*, 1999:206). The type of infection caused by food is called food-borne illness or - infection. This includes any illness caused by eating a food that is contaminated with a

bacteria, virus, mould or parasite. Examples of organisms that can cause a food-borne illness or infection are *Escherichia coli*, *Salmonella* and *Listeria* (Addendum E).

Another risk factor is bacterial translocation or the movement of micro-organisms from the alimentary tract to extra-intestinal sites, such as the mesenteric lymph nodes, bloodstream, liver and spleen. In an intact immune system, these translocating bacteria are effectively killed in the gut lamina propria and *in situ* in the reticuloendothelial system, effectively preventing the occurrence of septicemia. In animal models the three primary mechanisms that increase bacterial translocation are immuno-suppression, increased permeability of gastrointestinal mucosa, and intestinal bacterial overgrowth (Moody *et al.*, 2002:718).

Mucositis is a frequent, but transient side-effect of chemotherapy. It coincides with profound changes in the integrity of the mucosal epithelia that line the oral cavity, esophagus and the gastrointestinal tract. Changes at microscopic level result in a denuded mucosa, which can lead to bacterial, viral or fungal invasion of the bowel wall, sepsis, ulceration, bleeding, malabsorption, diarrhoea, and pain throughout the gastrointestinal tract. Oral mucositis affects up to 75% of patients undergoing HSCT (Parrish, 2005:86).

In various rodent models, Berg (1999:11) demonstrated that rodents' damaged mucosa (mucositis) also increased the risk for sepsis due to the increased rate of both direct seeding of bacteria into the bloodstream and increased translocation to mesenteric lymph nodes. Animal models have shown that this increased mucosal permeability after chemotherapy involves decreased expression of CD4 on neutrophil and lymphocytes present in gut mucosa. Mucositis is an established risk factor for sepsis in neutropenic cancer patients (Moody *et al.*, 2002:718).

Changes in normal microbial flora can occur due to antibiotic use. In hospitalized patients, recolonization of normal microbial flora with nosocomial organisms may lead to infections that are more difficult to treat (Moody *et al.*, 2002:718).

By using a diet of cooked, low-microbial foods, many sources of pathogenic organisms can be eliminated, the bacterial burden of the gut reduced, and the microbial ecology of the small intestine maintained. The theory and goal of the LBD is to potentially reduce the risk of bacterial and fungal infections and to avoid sepsis (Todd *et. al.*, 1999:206).

2.6.2 Evidence for the use of IMM Diet and HACCP

Sources of food-borne infection or "food poisoning" may be the food handler, the environment (such as a contaminated work surface) or the food itself (Addendum E). Butterweck (1995:602) confirmed this by concluding that three of the major sources of food pathogens from the hospital food preparation area (kitchen) are: (1) the food, generally animal protein source; (2) the human preparer, often from inadequate washing of hands; and (3) the environment, often through cross-contamination.

Food-borne infection epidemics have been tracked for almost a century, and this has revealed that the most common food vectors of these infections are undercooked meat, poultry, eggs and fresh water sources. *Campylobacter*, *Shigella* and *Salmonella* represent the three most common offending organisms in food-borne infections. These three organisms don't present common neutropenic infections in paediatric cancer patients, as most patients develop infections from organisms present in their normal flora (Moody *et al.*, 2002:717).

Although infection continues to be one of the most critical complications endured by immuno-compromised patients, advancements in antibiotic therapy have led to a liberalization of traditional strict isolation procedures like laminar air flow and cover gowns or protective clothing (Todd *et al.*, 1999:206; Larson & Nirenberg, 2004:720). Despite more lenient infection control practices, food restrictions continue to be strictly enforced in many institutions.

Restricted food items which are cold and basically odourless are often particularly appealing to patients with transplant-related complications such as nausea, vomiting and sore or dry mouths (Todd *et al.*, 1999: 706). According to Parrish (2006:90) a single-centred trial examined the intake patterns of HSCT patients and found that of the 205 surveyed patients most preferred clear liquids (for example, soda, juice and popsicles).

In theory a LBD is assumed to reduce infection risk by reducing potentially pathogenic organisms from the diet. Considering that HSCT patients' struggle to consume adequate amounts of food orally because of treatment side-effects, the use of LBD poses unnecessary dietary restrictions compounding the problem of diminished oral intake (Parrish, 2006:90; Todd *et al.*, 1999:206). Diet also plays an important part in quality of life and severe dietary restrictions could have an impact on the patients' quality of life (Moody *et. al.*, 2002:720).

Recommendations regarding the use of LBDs have been based on theoretical concepts of reducing the risk of contracting infections from pathogens found in food sources rather than on clinical trials (French *et al.*, 2001:1194). The Oncology Nursing Society Cancer Chemotherapy Guidelines and Recommendations for Practice note that avoiding fresh fruit and vegetables during neutropenia is often recommended but is controversial and not well supported. Despite a lack of controlled studies to evaluate the effect of

salads and other raw food on sepsis rates in neutropenic patients, there is an assumption that eating uncooked food which contain bacteria will lead to infection (Wilson, 2002:46).

In addition to the lack of clinical evidence for the LBD diet there may be some more drawbacks to it. The restriction of fruits and vegetables in this diet may disrupt the delicate balance of the gut flora and increase the risk of bacterial overgrowth and translocation. Mild deficiencies, particularly of vitamin A, C and B₆, folate and zinc can cause impaired cell-mediated and/or humoral immune responses (Moody *et al.*, 2002:720).

Smith & Galford Besser (2000:516) documented that most hospital institutions placed patients on a LBD once they were neutropenic rather than restricting their diets when cancer treatment began. Dietary restrictions prior to development of neutropenia are recommended to prevent bacterial overgrowth in the GI tract. During the non neutropenic stage of the treatment the patients have ample opportunity to become colonized with potential pathogens that can cause infections.

In the absence of well-defined evidence-based practice guidelines regarding the LBD, one could consider the published guidelines for food safety by the Food and Drug Administration or Centers for Disease Control and Prevention. These organizations advise the consumption of only pasteurized juice, milk or cheese and well-cooked eggs, meat, poultry and fish for immuno-compromised patients. Notably these organizations do not recommend the restriction of fresh fruit and vegetables (Moody *et al.*, 2002:720).

Wilson (2002:49) reviewed clinical and research reports, in which the use of dietary restrictions in the prevention of infections in immuno-compromised individuals with malignant disease, were discussed. The review of the literature failed to identify studies that show a direct relationship between LBD

and the prevention of infection in chemotherapy-induced neutropenia. The literature points out the lack of scientific basis for food restrictions, wide variation in policies related to LBD and inconsistent compliance with established restricted diets.

The IMM recommendations developed from this review focused on hand washing and promotion of safe dietary practices that eliminate any food that can not be cooked or washed and to lift the current restriction on all fresh fruit and vegetables.

In most of the studies concerning development of infections in the neutropenic cancer patients the authors only investigated the diet for food choices, but food preparation and handling could definitely play a huge role in the development of infections in these patients (Smith & Galford Besser, 2000:519). Analyses of food-borne disease notifications throughout the world have shown that the majority of outbreaks result from malpractice during food preparation in places where food is prepared for human consumption (Eves & Seaman, 2005:279). According to Dezenhall *et al.* (1987:1351) little research has been done to determine the most effective food service methods to use in a hospital kitchen that provides meals to bone marrow transplant patients.

HACCP combined with an effective hazard analysis technique, allows safety and quality to be built into each step within the food production and food supplying process (Riswadkar 2000:33). According to Legnani *et al.* (2004:209) the implementation of HACCP principles can improve the microbiological quality of food and equipment.

The HACCP approach is different from the current inspection and end food sample testing method. HACCP is also a system of food safety management that, in the last few decades, has become an increasing part of national governments and international strategy to reduce the prevalence of food-

borne disease. There has been wide dissemination and scientific support of its principles (Baş *et al.*, 2005:124).

2.7 Problem statement

The Oncology Nursing Society Cancer Chemotherapy Guidelines and Recommendations for Practice note that avoiding fresh fruit and vegetables during neutropenia is often recommended but is controversial and not well supported. Despite the lack of controlled studies that have evaluated the effect of salads and other sources of raw foods on sepsis rates in neutropenic patients, there is an assumption that eating uncooked foods containing bacteria could lead to infection (Wilson, 2002:46). This study is one of the first similar studies conducted in South Africa.

The objectives are to investigate the current food safety and hygiene status in a hospital food service unit serving immuno-suppressed diets by means of a questionnaire and bacterial swabs taken from the food service unit. The author will utilize the gathered information in a structured action plan to implement HACCP standards successfully in the food service unit.

HACCP implementation in food service units could improve food safety and prevent food-borne illnesses by focussing on identifying and preventing hazards that could cause food-borne illnesses. Combined with an effective hazard analysis technique, HACCP allows safety and quality to be built into each step within the food production and food supplying process (Riswadar 2000:33). This approach is different from the current inspection and end food sample testing method.

HSCT patients are following a LBD at the moment. The food and safety system will be evaluated according to international HACCP standards. The author will also investigate the possibility to change the current food and

safety system in the food service unit, to an HACCP approved system. This HACCP approved food service unit could possibly serve the more lenient IMM diet without any risk of food-borne illnesses.

2.8 Conclusion

The literature confirms that instead of mainly focusing on the selection of food items allowed and the cooking methods used in HSCT diets, the type of food service as well as the food and safety protocol which the food service follows could play an important role in providing food that is safe for HSCT patient use.

The implementation of the HACCP system is essential in producing meals that are hygienically prepared and safe for human consumption, especially when the patient is immuno-compromised. The HACCP system forms a strong scientifically based foundation or safety net for the hospital food service unit to provide a less strict IMM diet to immuno-compromised HSCT patients.

More current research should be done regarding the food preferences of HSCT patients during their neutropenic period. The change from the strict LBD to the more lenient IMM diet could result in increased oral food intake and patient satisfaction, as well as an improved nutritional status.

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Chapter 3: Article

Implementation of hazard analysis and critical control point (HACCP) system in a food service unit serving low bacterial diets to immunocompromised Hematopoietic Stem Cell transplant patients.

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Impact factor

3.1 Guidelines for authors

Authorship and Contributorship

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An "author" is generally considered to be someone who has made substantive intellectual contributions to a published study, and biomedical authorship continues to have important academic, social, and financial implications. (1) In the past, readers were rarely provided with information about contributions to studies from those listed as authors and in acknowledgments. (2) Some journals now request and publish information about the contributions of each person named as having participated in a submitted study, at least for original research. Editors are strongly encouraged to develop and implement a contributorship policy, as well as a policy on identifying who is responsible for the integrity of the work as a whole.

While contributorship and guarantorship policies obviously remove much of the ambiguity surrounding contributions, it leaves unresolved the question of the quantity and quality of contribution that qualify for authorship. The International Committee of Medical Journal Editors has recommended the following criteria, which are still appropriate for those journals that distinguish authors from other contributors, for authorship:

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2) drafting the article or revising it critically for important intellectual content; and 3) final approval of the version to be published. Authors should meet conditions 1, 2, and 3.

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Implementation of hazard analysis and critical control point (HACCP) system in a food service unit serving low bacterial diets to immuno-compromised Hematopoietic Stem Cell transplant patients.

EE Vermeulen, SM Hanekom, W Oldewage-Theron

Abstract

Main aim: To supply recommendations to implement a Hazard Analysis of Critical Control Points (HACCP) system in a hospital food service unit serving low bacterial diets in order to prevent or decrease the infection rates in Hematopoietic Stem Cell Transplant (HSCT) patients.

Objectives: Firstly, to investigate the current food safety and hygiene status in a hospital food service unit serving low bacterial diets by means of a questionnaire and bacterial swabs taken from the foodservice unit.

Secondly, to utilize the gathered information in a structured action plan to implement HACCP standards successfully in the appointed food service unit. The implementation of HACCP will not be done by the author.

Design: The primary research was done in a food service unit of a 350-bed private hospital. One unsuspected audit with a pre-designed audit form was done. The audit consisted out of ten categories. A percentage was allocated to each category. Four swabs, as well as four food samples, were taken during the audit. The swabs and samples were tested to assess the microbiological safety of the foods prepared in the appointed hospital food service unit. The results of the audit, swabs and food samples were used to evaluate the current Food and Safety System of the hospital food service unit according to internationally approved HACCP standards.

Setting: The study was conducted in the metropolitan area of Gauteng, South Africa.

Results: None of the ten areas audited was on standard and an average of 37% was scored. Category 5, the service and distribution area, scored the highest (69%), and category 10, the quality procedures and records division, scored the lowest (6%). According to United States Food and Drug Administration Baseline Report five forbidden policies could lead to increased risk of food borne illnesses. All five forbidden policies were detected in the food service unit during the audit. The microbiological tests showed relatively high microbial counts.

Conclusion: The results of the study confirmed that instead of focusing mainly on the selection of food items allowed and the cooking methods used in HSCT diets, the type of food service, together with the food and safety protocol that the food service follows, could play an important role in providing food that is safe for HSCT patient use.

Abstract: 405 words

Text: 4576 words

Introduction

Due to the substantial suppression of the immune system following a Hematopoietic Stem Cell transplant (HSCT), patients are at higher risk of developing life-threatening infections.¹ A very strict, low-bacterial diet (LBD) is given to these patients. In the study we will review the different variations on this diet as well as the liability of each. An aspect that could play an important role in the prevention of food borne illness with HSCT patients is the food safety system that a facility uses. Improper food handling is responsible for 97% of food borne illnesses associated with catering.²

A formal programme for promoting and maintaining food safety is essential. A Hazard Analysis Critical Control Points (HACCP) programme is an ideal, proactive approach to ensure food safety.³ HACCP has become an essential part of national and international strategy to reduce the prevalence of food borne disease.⁴

Defining Haematopoietic Stem Cell Transplant

Hematopoietic Stem Cell Transplant (HSCT) is the infusion of hematopoietic stem cells from a donor to a patient who has received chemotherapy, which is usually marrow-ablative. The basic concept of HSCTs underpins the regimes of dose intensity. Higher doses of radiotherapy and/or chemotherapy may be given than would otherwise be possible.⁴

According to Parrish⁵ more than 40 000 HSCTs are performed world-wide each year. HSCT has been used to treat neoplastic diseases, hematologic disorders, immuno-deficiency syndromes, congenital enzyme deficiencies and auto-immune disorders like lupus erythematosus or multiple sclerosis.

HSCT is largely divided into three types: (i) allogeneic transplants; (ii) autologous transplants; and (iii) syngeneic transplants.⁴

Cells used in allogeneic HSCTs are harvested from a donor other than the transplant recipient. Such transplants are the most effective treatment for persons with severe aplastic anemia and offer the only curative treatment for a person with chronic myelogenous leukemia. Allogeneic donors may be a blood-relative or an unrelated donor. Allogeneic transplants are usually more successful when the donor is a human lymphocyte antigen (HLA) – identical twin or matched sibling.⁵

The patient's own cells are used in an autologous HSCT. Autologous HSCTs are preferred for patients who require high-level or marrow-ablative chemotherapy to eradicate an underlying malignancy but have healthy, undiseased bone marrows. Autologous HSCTs are used most frequently to treat breast cancer, non-Hodgkin's lymphoma and Hodgkin's disease.⁴

Syngeneic transplants are reliant upon the recipient having an identical twin as a donor and this type of HSCT occurs to a lesser degree.⁴

Defining low-bacterial diet (LBD)

Nutritional support is considered an integral part of the supportive care of HSCT patients.⁶ The LBD is intended to reduce the digestion of bacterial and fungal contaminants by the exclusion of food such as uncooked fruits and vegetables, cold meat cuts, undercooked eggs and meats as well as unsterilized water, unpasteurized milk products, and soft cheeses. The LBD is primarily used for patients who are undergoing BMT. BMT is becoming a standard treatment for various diseases including many types of cancer.

The LBD could also be used for other immuno-compromised patients such as those with AIDS, leukemia, or aplastic anemia.⁷

Defining HACCP

The National Advisory Committee on Microbiological Criteria for food in America defined HACCP as a management system, in which food safety is addressed through the analysis and control of biological, chemical and physical hazards from raw material production, procurement and handling, to manufacturing, distribution, and consumption of the finished product.⁸

Dietetic undergraduate students were taught to make clinical decisions based on scientific data, and not personal reference or anecdotes. This was generally accepted in the nutrition and clinical arenas, but not often stressed in the practice of food service management. However, implementation of HACCP in a food service unit is also enhanced if a manager has scientific background on which to base decisions.⁹

The overall goals of a HACCP programme are twofold: to ensure the safety of food and nutrition products and to create a process for corrective action and continuous improvement.³

With HACCP in place, a food processor can identify and monitor specific food borne hazards that are biological, chemical or physical in nature. It focuses on identifying and preventing hazards that could cause food borne illnesses, rather than relying on spot checks of manufacturing processes and random sampling of finished products to ensure safety.¹⁰ The important fact to understand is that HACCP is not an extra group of tasks done in addition to the current workload. It's a management system that replaces the current system.

Structure of the research project

Methods and materials

Subjects: The hospital food service unit consists of eight staff members per shift. The assistant kitchen manager, in the absence of the food service manager, assisted the author with the audit.

Institution: The study was conducted in the food service unit of a private 350-bed hospital situated in Gauteng, South Africa. The food service unit serves an estimated 1200 meals per day, including patient and staff meals. From this an estimated amount of twenty one meals are specially prepared for the Hematopoietic Stem Cell Transplant Patients (HSCT). Seven private, isolated rooms are allocated in the oncology ward for the HSCT patients.

Study design: The study was being performed in two phases. In the first phase of the study an unexpected, outside audit of the appointed hospital kitchen was conducted by the author. A pre-designed HACCP audit form was used. The audit form has a scoring system to evaluate the current HACCP system in the kitchen. The audit form is currently used by Khagiso Khulani Food Services and was tested and approved by Societe Generale de Surveillance Group (SGS), South Africa Proprietary (PTY) Limited (Ltd) which is a South African National Accreditation System (SANAS) Accredited Laboratory.

The second phase of the study involved the compilation of a Food Safety and Hygiene Report from the information collected during the audit.

Micro-organism analysis: The auditor randomly took four food samples during the audit. Each food sample contained 25g of food.

The food samples were stored in separate, sterile, plastic containers sealed with screw caps. The following analysis was done by SGS South Africa (Pty) Ltd:

- Total Aerobic Plate Count in colony forming units, gram (cfu/g)
- Coliform (cfu/g)
- *E.coli* (cfu/g)
- *Staphylococcus aureus* (cfu/g)
- *Salmonella* spp./25g

All the food samples, as well as swabs were placed in a cooler bag with ice packs immediately after collection. The cooler bag was kept in a sliding door fridge with an accurate thermometer to ensure the correct holding temperature of between 2°C and 8°C. The samples and swabs were collected from the fridge within 12 hours of the audit. The plastic containers for the food samples, as well as swab sticks were obtained from Drs Du Buisson, Bruinette, Kramer Incorporated Pathologists.

The auditor also randomly took four surface swabs. One swab from the hand of a randomly picked kitchen worker in the cooking or preparation area, and three randomly picked surface swabs were done. A sterile swab stick was used with each swab. The swab stick was placed in a sterile container and sealed after each swab was taken. The following analysis was done by SGS South Africa (Pty) Ltd:

- Total Aerobic Plate Count (cfu/g)
- Coliform (cfu/g)
- *E.coli* (cfu/g)

Collection < 50Kilometres (Km)

(Distance from hospital to SGS was less than 50 kilometres)

Sampling technique:

Bacteriological cultures: The analysis was conducted by SGS, South Africa (Pty.)

- **Total aerobic plate count.** The total aerobic plate count is intended to indicate the level of micro-organisms in a product. Ten grams of the sample taken were weighed and put into 90 milliliters (ml) peptone water, and then placed in Stomacher for 2 minutes. Subsequent 10-fold dilutions were made to 10^{-6} . All dilutions were plated by the pour-plated method, in duplicate, using South African Bureau of Standards (SABS) International Organization for Standardization (ISO) method 4833:1991. Average counts obtained were expressed as colony-forming units per gram of food (cfu/g).¹¹
- **Coliform count and *Escherichia coli*.** Coliforms are defined as Gram-negative rods that produce acid and gas from lactose during metabolic fermentation. *E. coli* 0157:47 represents one of the hundreds of strains of the bacterium *E.coli*. Although most strains are harmless and live in the intestines of healthy humans and animals, this strain produces a powerful toxin and can cause severe illness. The above dilutions were plated by the pour-plate method, in duplicate using violet red agar (VRB) according to SABS ISO method 4832:1991. *E. coli* was differentiated from other Coliforms using standard microbiological tests. A positive indolge test and the presence of short Gram-negative rods were taken as positive for the presence of *E. coli*.¹¹
- **Salmonella.** Salmonellosis is an infection caused by Gram-negative bacillus of the *Salmonella* genus. Infection with these

bacteria may affect only the intestinal tract, or may spread from the intestines to the bloodstream and then to other body sites.

The cause of this infection is contaminated food or water, or direct contact with other infected humans. Twenty- five grams of food samples taken were placed into 225 ml of buffered peptone water and incubated at 37°C for 24 hours according to SABS ISO method 6579. The presence of salmonella was determined by means of laboratory tests designed to identify this form of bacteria.¹¹

- ***Staphylococcus aureus.*** *Staphylococcus aureus*, often simply referred as 'staph' is a bacterium commonly found on the skin and nose of healthy people. Staphylococci are a Gram-positive spherical bacterium that occurs in microscopic cluster with *S. aureus* being yellow in colour and *S. epidermidis* being white in colour. Dilutions from the total aerobic platelet count (TAPC) were plated onto Baird-Parker agar containing appropriate supplements in duplicate, using the spread-plate method, according to ISO method 6888. Five typical colonies were picked off and the coagulase test was conducted using Staphylase Kid Dir 595. Coagulase-positive colonies were recorded as *S. aureus*.¹¹

In the second phase of the study, the results of the Food Safety and Hygiene Report were used to compile a detailed action plan to implement HACCP in the assigned hospital kitchen. The implementation of HACCP will not be executed by the author.

Ethical considerations

The author obtained permission from the Food Service Manager of the kitchen and the Safety, Health, Environment and Quality (SHEQ) Coordinator of the hospital to conduct the audit.

Statistical analysis

A single audit was done in the kitchen facility of one hospital. Supportive laboratory data where the same variables were tested was done by SGS. Epidemiological data in the form of review studies, as well as randomized trial articles, were obtained from Scirus, Medline, Pubmed, Ebscohost and Science Direct to confirm results of laboratory data and audit results. Different variables were calculated and compared to one another in table form. The audit was divided into eleven categories. The average percentage of each category was calculated.

Results of the food safety and hygiene audit

The study was conducted in the food service unit of a private 350 bed hospital situated in Gauteng, South Africa. The food service unit serves an estimated 1200 meals per day, including patient and staff meals. From this an estimated amount of twenty one meals are specially prepared for the Hematopoietic Stem Cell Transplant Patients (HSCT). Seven private, isolated rooms are allocated in the oncology ward for the HSCT patients.

Table I summarizes the results obtained during the audit. The audit consisted of ten categories (Table I). Each category was individually audited and a score allocated which was converted to percentage. None of the ten areas audited was on an acceptable standard (average score of 37%). Category 5, the service and distribution area, scored the highest (69%) and category 10, the quality procedures and records division scored the lowest, (6%).

TABLE I. CLEANING/SANITATION CHECKLIST REPORT (DIFFERENT AREAS IN KITCHEN)	*PERCENTAGE SCORED
1. Receiving area	45%
2. Storage area: Dry Storage and Refrigerated Storage	32%
3. Sub-zero Storage and Chemical Storage	14%
4. Preparation/Production	48%
5. Service/Distribution	69%
6. Customer Area	68%
7. Premises and Equipment Hygiene	43%
8. Staff Standards	61%
9. Staff Premises	20%
10. Quality Procedures/Records	6%
Average	37%

*A score smaller than 80% means facility needs to implement critical control points in order to upgrade current food and hygiene standards. A score above 80% means facility applies to current HACCP standards.

Factors that could increase the risk of development of a food borne illness were listed in Table II. According to Food and drug Administration (FDA)¹² five factors could play a role in the development of food borne illness. In this audited kitchen facility not all the food suppliers were HACCP approved and are listed according to this standard. No cooking or holding temperatures for food were recorded.

All of the factors mentioned above could lead to an increased risk for the development of food borne illnesses.

TABLE II. FOOD BORNE ILLNESS RISK FACTORS	*FORBIDDEN POLICIES FOLLOWED IN KITCHEN FACILITY	REASONS – DATA CAPTURED FROM HACCP AUDIT
Food from Unsafe Sources	Yes	Not all the suppliers are HACCP approved
Inadequate cooking	Yes	No cooking temperatures are recorded
Improper Holding Temperatures	Yes	No holding temperatures are recorded
Contaminated Equipment	Yes	See Table III.
Poor Personal Hygiene	Yes	No soap, hot water or toilet paper in staff sanitary facilities

United States Food and Drug Administration (FDA) Baseline Report – Food borne illness risk

High microbial loads were found in some of the surface swabs (Table III) and the sanitary facilities of the staff were not of an acceptable standard. The hands of food service employees can be vectors in the spread of food borne illness because of poor personal hygiene or cross-contamination. For example an employee might have contaminated his hands when using the toilet, or bacteria might have been spread from raw meat to salad greens by the food handler's hands.¹³

Four surface swabs were taken during the audit. The normal range permitted for the Total Aerobic Count (TAC) is 0-100cfu/25 square centimetres (cm²). The TAC for the patient food tray and chopping board was above 1000cfu/cm². No Coliforms should be present on the surface of kitchen equipment, both the patient food tray (>1000cfu/cm²) and the chopping board (>1000cfu/cm²) contained a high count of Coliforms. *Escherichia coli* should be in the range of 0-100cfu/cm². The patient food tray had a high count of 870cfu/cm² and the chopping board had a count of 350cfu/cm. Both counts were higher than the allowed permitted value.

Table III. MICROBIOLOGICAL REPORT OF FOOD SWABS TAKEN DURING AUDIT						
Analysis	Units	*Normal counts for swabs taken	Patient food tray	Chef hand	Chopping board – salad, cold desserts and sandwich area	Microwave oven knob – ward kitchen
Total Aerobic Count	Count/area	0-100 cfu/25cm ²	>1000	0	>1000	0
Coliforms	Count/area	No presence of Coliform allowed	>1000	0	>1000	0
E. coli	Count/area	0-100 cfu/25cm ²	870	0	350	0
	Collection area within 50 kilometres from SGS					
Total score (Maximum 2)			0	2	0	2

*Regulations Governing Microbiological Standards for Foodstuff and Related Matters (R.692 of May 1997)

* 0 = Presence of Coliform on hand swabs, 2 = Coliform count between 0-100cfu/cm

In Table IV the analysis of the swabs taken is shown. Four food samples were taken.

Table IV. MICROBIOLOGICAL ANALYSIS OF FOOD SAMPLES TAKEN DURING AUDIT										
Analysis	TAC (cfu/g)	*Normal values	EC (cfu/g)	*Normal values	TC (cfu/g)	*Normal values	SA (cfu/g)	*Normal values	S	*Normal values
Green beans and potatoes	490	<100000	ND	A	ND	<10	ND	A	A	A in 25g
Chicken gravy	12700	<10000	280	A	2760	<100	ND	A	A	A in 25g
Cold meat	1220	<200000	30	A	190	<200	ND	A	A	A in 25g
Quiche	18700	<20000	ND	A	30	<50	ND	A	A	A in 25g
TAC = total aerobic count; EC = <i>Escherichia coli</i> ; TC = Total Coliforms; SA = <i>Staphylococcus aureus</i> ; S = <i>Salmonella</i> spp in 25g; ND = None detected; A = Absent										

*Regulations governing Microbiological Standards for Foodstuff and Related Matters (R.692 of May 1997)

All the microbial counts for the green bean and potato sample were in the normal range allowed.

The chicken gravy had a high total aerobic count (TAC) of 12700cfu/g, the normal range allowed is 10 000cfu/g or less. The chicken gravy also contained *Escherichia coli* (EC) of 280cfu/g. The sample shouldn't contain any trace of EC. The total amount of Coliforms (TC) allowed is less than 100cfu/g. The chicken gravy contained 2760cfu/g TC. This count is much higher than allowed.

All the microbial counts for the cold meat sample were within allowed normal ranges.

The quiche contained a high count of TC. No trace of TC should be present in food samples. The TAC, EC and *Staphylococcus aureus* (SA) were within normal ranges allowed for 25g of food.

Discussion

Hygiene and food safety

The most important finding of the Food and Safety audit done in the kitchen facility serving low-bacterial diets (LBD) to Hematopoietic Stem Cell Transplant (HSCT) patients is the fact that the standard of the food and hygiene system in the kitchen facility could determine the safety of the food served to HSCT patients. The results confirmed the theory of Dezenhall, Curry-Bartley and Blackburn^{1,14} which stated that, instead of focusing on the types of food allowed with neutropenic HSCT patients, the type of food service, as well as the food and safety protocol that the food service follows, could play a huge role in providing food that is safe for HSCT patient use.

Even though patients did receive a LBD, some of the food items still had high microbial counts which increase the risk of food borne illnesses.

Food borne illnesses are mainly connected to poor manufacturing practices during meal production, such as retarded cold storage, preparation far ahead of consumption, inadequate re-heating and hot-holding temperatures.¹⁵ Food borne pathogens can multiply if food is not maintained at the appropriate temperature levels and during delays between food preparation and distribution.¹⁶ In a study by Shojaei, Shooshtaripoor and Amiri¹⁷ it was found that poor personal hygiene by food handlers frequently contributes to outbreaks of food borne illnesses caused by *Staphylococcus aureus* and gram negative bacilli such as *Salmonella* spp., *Shigella* spp. *Campylobacter jejuni*; enterotoxigenic *E. coli* as well as viral agents such as hepatitis A and Norovirus.

According to a study by Alejandro and Ponce-de-León¹⁸ many hospitals do not monitor the quality of food received from food suppliers, and several food handling short cuts are followed, such as improper cooking or holding temperatures, as well as cross contamination.¹⁹ This study confirmed the findings of the researcher: a low score was achieved in this food and hygiene audit. Infection control professionals should include periodic audits of food preparation practices in their hospitals.

Total control of every step throughout production, cooking and display is necessary to assure high microbiological quality of meals. Consumer protection from food borne illness can be achieved by personnel training, implementation of good manufacturing practices and hygienic food preparation. Moreover a systemic approach to the identification, evaluation and control of food safety hazards such as the HACCP system must be carried out to achieve food safety and to prevent food borne illnesses.^{15, 20}

An update in 2000 on emerging infections from the Centers for Disease Control and Prevention in Atlanta, America²¹, showed a decline in *salmonellosis* and *campylobacteriosis*. The declines may reflect changes in the meat- and poultry-processing plants in the United States (US) mandated by the Pathogen Reduction and HACCP rule of the US Department of Agriculture.

Legnani, Leoni and Berveglieri²² performed 236 inspections on 27 catering establishments in the province of Ferrara, Italy after a HACCP system was introduced and educational programmes for food staff was undertaken for approximately 10 years. The results revealed an improvement in the microbiological quality of the food and equipment. An equally important point is the identification of weak points in the general management of the food production. This knowledge is essential to establish critical control points (CCPs) and to adjust staff training.

Low-Bacterial Diet versus Immuno-compromised Diet

It has been established that optimal nutritional support in HSCT patients is an essential component of their care. HDCT has been associated with marked protein catabolism leading to loss of body cell mass and high urinary nitrogen levels.⁷ The research available is conflicting and inconclusive as to whether dietary restrictions such as those imposed by LBD will truly benefit this patient group.^{1,12,23}

Although infections continue to be one of the most critical complications endured by immuno-compromised patients such as HSCT patients, advancements in antibiotic therapy have led to a liberalization of strict isolation procedures, like the use of laminar air flow (sterile) environments. Despite these more lenient infection control practices, food restrictions continue to be stringently enforced in many institutions.²⁴

According to Moody, Charlson and Finlay^{25,26} the neutropenic diet, has remained standard practice in oncology centres despite lack of evidence for it's use.

These food restrictions could lead to limited oral food intake by HSCT patients. This could lead to weight loss, muscle wasting and a generally poor prognosis. The reasons for the limited oral food intake could vary. The HSCT patients are often kept in isolation for three to six weeks. The menus can get tedious and boring during this period. No uncooked food such as fresh vegetables or fruit is allowed at the audited centre, and at other hospitals yoghurt and ice cream are also excluded from the menu. Many of the patients battle with chemotherapy side-effects, such as nausea, vomiting, mucositis and a strong sense of smell. The restricted food items such as yoghurt, ice cream, and fresh fruit and salads which are cold and virtually odourless, are often particularly appealing to patients with these treatment side-effects.²⁵

The prescribed diet is the one part of the hematopoietic stem cell transplant process which the patient and their families can take control over. Psychologically the menu and diet could play a negative or positive role in contributing to a feeling of control in this instance. Reduced food intake could lead to increased anxiety and stress levels with the patient's family as well as nursing staff. Loss of appetite, diarrhoea, and mucositis were among the eight symptoms ranked as most distressing by HSCT patients and nurses.⁷

The Seattle Cancer Care Alliance followed a LBD diet until 1994. In 1994 they liberalized the diet for HSCT patient to the IMM (Immuno-compromised diet). In addition to protecting the patient from food borne illness and fungal organisms, the IMM diet is designed to allow a wide variety of nutritious and conventional foods to promote resumption of oral intake in post transplant

patients. A major focus of the diet, which is different from many LBD diets, is the restriction of foods that may be a source of fungal and mould organisms. Fungal infections continue to be the major morbidity and mortality risk factor compared to the more treatable bacterial infections. Most fresh fruits and vegetables are allowed but must be washed thoroughly.²⁷

The IMM diet is followed by in-patients as well as out-patients. The HSCT patient, regardless of environment and the number of days after the transplant, is at risk of food borne illnesses. The key to the success of the IMM diet is that it is followed regardless of the environment the patient may be in (hospital, clinic or home). Patients receiving their own stem cells (Auto) follow the diet for three months post-transplant. Patients receiving family-related or donor stem cells (Allo) follow the IMM diet for as long as they are being treated with immuno-suppressive drugs like prednisone.

The IMM Diet is prepared in the same way as all other hospital diets. Normal china crockery is used, which is washed in a regular dishwashing system. Food is assembled on the tray line (open air) and if delivered in food trolleys, requires no additional wrappings or coverage.

The foundation of the IMM diet is based on the strict HACCP food and safety standards followed in the kitchen facility. The HSCT patients, as well as their family and/or careworker, must attend a food safety workshop before the transplant is done, to ensure that strict hygienic food standards are followed on an out-patient basis as well. Food safety education consists of topics such as hand washing procedures²⁷, sterilization of the kitchen area and equipment and elimination of cross-contamination.²⁸ Adequate storage temperatures are addressed and meat and eggs must be cooked to the "well done" stage. The importance of pasteurization in milk products is addressed as well as fast and restaurant foods.²⁴

IMM combined with HACCP

The use of a HACCP system, good manufacturing practices, hygienic food preparation and personnel training is essential to ensure food that is safe to eat.¹⁷ The IMM diet could easily be served from a hospital kitchen without disrupting the main food service system. Food service practices are dependent on HACCP and safe food/equipment handling within the kitchen and food service environment. The food item or product should be prepared, stored and served according to standard HACCP guidelines.

Conclusion and recommendations

The results of the study confirmed that, instead of mainly focusing on the selection of food items allowed and the cooking methods used in HSCT diets, the type of food service as well as the food and safety protocol that the food service follows, could play an important role in providing food that is safe for HSCT patient use.

The implementation of the HACCP system is essential to produce meals, which are hygienically prepared and safe for human consumption, especially when the patient is immuno-compromised. The HACCP system forms a strong scientifically based foundation or safety net for the hospital food service unit to provide a less strict IMM diet to immuno-compromised HSCT patients.

This was a very small study. The implementation of HACCP could not be done because after the first audit the structure of the kitchen changed due to building renovations. The first audit was supposed to serve as the control or base line of this study. No HACCP implementation followed because the base line changed. The data can however, still be of substantial value for future use in planning and implementation of HACCP in a hospital kitchen.

A follow up study is recommended where a detailed HACCP action plan implemented in this private hospital food service unit. Intensive personnel training and motivation will form an essential part of the HACCP implementation. After HACCP implementation three follow-up audits should be done at the end of a selected time period by outside auditors to prevent bias. The results of these three audits could be compared to investigate if an improvement in the food quality as well as safety standards with HACCP implementation was found. The information could be obtained through the standard audit form used in this study as well as patient questionnaires and the recording of food borne illnesses during the hospitalization period of HSCT patients.

Oral food intake, patient satisfaction and nutritional status of patients could also form part of the follow-up study. When the kitchen is HACCP approved, the current LBD menus could be changed to the less-restrictive IMM diet.

The IMM diet in combination with HACCP application could also be used with other immune compromised patients such as the elderly, Human Immunodeficiency Virus (HIV) patients, organ transplant patients and in hospital ICUs.

More current research should be done regarding the food preferences of HSCT patients during their neutropenic period. The change of the strict LBD to the more lenient IMM diet could result in increased oral food intake and patient satisfaction as well as improved nutritional status.

Dieticians could play an important role in implementing internationally approved HACCP in hospital food service units. Dieticians can also form an integral and important part of the HSCT medical team.

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Chapter 4: Recommendations and conclusions

4.1 Introduction

There is international consensus that HACCP is a proven management system, which provides confidence that all aspects of food safety are being effectively managed (Worsfold, 2006:32; Bertolini, Rizzi and Maurizio, 2006:1; McClusky, 2004:1699).

The seven principles of the HACCP concepts are:

1. Conduct a hazard analysis.
 2. Identify the CCPs in the process.
 3. Establish critical limits (CLs) for the preventative measures associated with each identified CCP.
 4. Establish CCP monitoring requirements.
 5. Establish corrective actions to be taken when monitoring indicates that there is a deviation from an established CL.
 6. Establish effective record-keeping procedures that document the HACCP system.
 7. Establish procedures for verification that HACCP is working correctly.
- (Bryan, 1999:11; Bolat, 2002:345; Griffith, 2006:358)

4.2 Summary of findings

In the study a hazard analysis or audit was conducted by the author. A Food and Safety Report (Addendum A) was used. The audit consisted of ten categories. CCP's were allocated to each category with an individual scoring system. This allowed the author to identify problem areas in the hospital food service unit. The second objective of the study was completed when the author addressed each category's problems with a detailed action plan

(Addendum C). Addendum D is the technical documentation needed to implement the various CCP's that form the foundation of a HACCP food service system. It contains examples of records that need to be completed by food service personnel to form a documented HACCP food service system. This will provide back up for the food service unit in case of a crisis like suspected food poisoning.

The hospital food service unit received a copy of the audit report. The unit is currently busy to implement a similar hygiene control system.

4.2 Limitations of the study

This was a small study with only one HSCT unit involved. There was no bias line because of the renovations done in the kitchen after the first audit. Recommendations could only be made and none was implemented by the author.

4.4 Recommendations for further research

A more comprehensive study where one non-HACCP approved hospital food service unit serving low bacterial diets to HSCT patients, should also be audited. HACCP principles must then be implemented in the unit. The audit must then be repeated after a three month and six month period, to be able to draw any clear conclusions on specific outcomes of hygiene.

4.5 Conclusion

The results of the study confirmed that instead of focusing mainly on the selection of food items allowed and the cooking methods used in HSCT diets, the type of food service, together with the food and safety protocol that the

food service follows, could play an important role in providing food that is safe for HSCT patient use.

ADDENDUM A

FOOD SAFETY AND HYGIENE REPORT

DATE OF AUDIT & TIME:	20 December 2005
AUDITOR:	Renza Vermeulen

Scoring guidelines – Food Safety and Hygiene Report

Maximum points: 2 - Excellent, HACCP standard achieved
 1 - Need action plan to improve
 0 - Not up to HACCP standard

** Templates of audit forms available from author*

FOOD SAFETY & HYGIENE REPORT

SECTION 1 CLEANING / SANITATION CHECKLIST REPORT

1. RECEIVING AREA			
	MAX. POINTS	POINTS ACHIEVED	COMMENTS
Are the walls clean and in a good condition?	2	1	Tiles chipped, need to be replaced
Is the floor surface finish appropriate and clean?	2	0	No cleaning schedule for floor, uses mob once a day, Tuesday Prestige cleans floors with machine
Is the ceiling in good state of repair and of appropriate finish?	2	2	Cleaning schedule needed
Is the Forbidden Product Policy adhered to?	2	0	Expiry date needed on all perishable items, no refreezing of items, no defrosting of items in water
Is there an appropriate scale available?	2	2	Scale should be cleaned
Is the scale in working order?	2	2	
Are temperatures of all perishable goods received monitored and recorded?	2	0	Recordings should be done
Is the company's receiving procedure on display in the receiving area, and is it adhered to?	2	0	Receiving procedure should be displayed
Are perishable goods received transferred timeously to appropriate storage? (within 15 minutes of arrival)	2	2	
Is the physical condition of all stock checked for pest infestation or product abuse/mishandling?	2	0	Could be checked more thoroughly (assistant should receive stock not chef)
Is the receiving area clean and uncluttered?	2	1	No specific receiving area – deliveries done in kitchen, should plan kitchen better to eliminate this
General Comments:			Specific delivery area needed.
TOTAL	22	10	
Micro Result (Pass – Yes or No)			N/A
Final Percentage			45%

2. STORAGE AREA			
2.1. Dry Storage			
	MAX POINTS	POINTS ACHIEVED	COMMENTS
Is the store room in a good state of repair / maintenance? Light covers on light bulbs?	2	1	Needs light cover
Are commodities stored to permit effective stock rotation? No expired stock observed	2	1	Needs better planning and more effective rotation procedures should be implemented
Are boxes / containers / packaging date stamped or labeled?	2	0	All products should be labeled
Is all stock in apparent good condition – e.g. not torn?	2	1	Open bins, torn packaging, opened boxes
Is there any stock being stored on the floor?	2	0	Eggs & bananas was stored on floor
Are storage containers clean and sealed (if appropriate)?	2	0	Should be cleaned, lids needed
Are goods returned to stores put in containers and labeled with "use by" dates?	2	0	Should be put in applicable containers and labeled with dates
Is potential for cross-contamination controlled?	2	1	Better control needed
Are there any open tins in any store room?	2	0	Yes, mustard
Is store room shelving clean?	2	1	Regular cleaning schedule needed, plastic name tags should be removed
Is the store shelving in a good state of repair?	2	1	Rusted, should be painted
Are good housekeeping practices evident?	2	1	Room for improvement
Is there any evidence of pets?	2	2	
Ambient air temperature of dry store room?	2	0	Need thermometer
2.2. Refrigerated Storage			
2.3. Main Fridge's			
Are refrigeration units in a good state of repair?	2	1	Rusted
Is there evidence of ongoing effective cleaning activities?	2	1	Cleaning roster needed
Is there any stock being stored on the floor?	2	0	Mayonnaise in plastic containers, fruit and vegetables stored in boxes on floor
Is all stock in apparent good condition – e.g. no torn packaging, blown tins etc.?	2	0	Boxes opened, jam in opened tins, need more packing space and plastic containers for vegetables and fruit
Are commodities stored to permit effective stock rotation? No Expired stock observed.	2	1	Better planning needed
Are all boxes / containers / packaging date stamped or labeled?	2	1	Not everything labeled
Are goods returned to the refrigerator store put in containers and labeled with 'use by' dates?	2	0	Not labeled
Are there food control samples (chilled) 2-day cycle?	2	0	Need to collect food samples – keep it for 72 h
Is the potential for cross-contamination controlled?	2	1	Better control needed
Are there any open tins in any stores?	2	0	Jam tins opened
Is there any evidence of pests?	2	2	
TOTAL:	50	16	
Final Percentage			32%

3. SUB-ZERO STORAGE			
3.1. Freezer			
Is the freezer unit in a good state of repair?	2	1	Front rubber strip missing
Is there evidence of ongoing effective cleaning activities?	2	0	Floor slippery and iced, need cleaning and defrosting schedule
Is there any stock being stored on the floor?	2	0	Ice cream stored on floor
Is all stock in apparent good condition – e.g. no torn packaging?	2	0	Boxes opened, plastic bags with stock – freeze bite
Are all boxes / containers / packaging date stamped or labeled?	2	1	Labeling needs to be done
Are sub-zero units free from ice build-up?	2	0	Floor frozen with ice and some of the products also has ice build up
Is Forbidden Process Policy adhered to – e.g. no re-freezing?	2	0	Refreezing has being done
Are commodities stored to permit effective stock rotation? No Expired stock observed.	2	1	Better rotation system needed
Temperature of stored frozen goods (should be within – 12°C to -18°C – range +2°C)			
Products Monitored:			Actual Recorded Temperature
3. Vienna's	2	0	Need thermometer
3.2. Chemical Storage Prestige – No chemical store in kitchen			
Are all chemicals stored separately from any food products?	N.A		
Are all chemicals clearly labeled?	N.A		
Is the chemical storage area well ventilated?	N.A		
Are the chemical store areas in a good state of repair?	N.A		
Is all cleaning equipment stored separately in an appropriate manner?	N.A		
Evidence of pests?	N.A		
General Comments:			A chemical store or cupboard needs to be implemented in kitchen for better hygienic control and to make sure the right chemicals and dilution ratios are used.
TOTAL:	22	3	
Final Percentage			14%

4. PREPARATION			
Are forbidden processes being adhered to (Thawing, Mince & Mayonnaise?)	2	1	Thawing
Is defrosting conducted under controlled conditions?	2	0	Should follow correct defrosting procedures – should defrost in cold room, not at room temperature (chicken breasts)
Is cross-contamination avoided at all stages of preparation / production?	2	1	Better control is needed – area for each food group to be prepared at.
Are all perishable foodstuffs' temperature controlled prior to processing / use (0 to +4°C)?	2	0	Need to keep perishable stuff in cold room until use
Is there a thermometer available to ensure that all temperatures can be monitored and recorded at the respective control points?	2	0	Control points needed as well as temperature charts
Is the thermometer available, appropriate, and are the measurements taken in line with the auditor's control measurements?	2	0	Thermometer broken
Is correct food holding techniques evident – e.g. food should not stand at room temperature for longer than 30 minutes?	2	1	Spaghetti was already finish at 10:30 for lunch – better planning needed
TEMPERATURE OF IN-PROCESS PRODUCT (chilled products should not be allowed to exceed 10°C during preparation; cooked products should not be allowed to drop below 60°C during preparation)			
Products Monitored:			Actual Recorded Temperature
1	2	0	Need thermometer
2.	2	0	Need thermometer
Is there a supply of hot and cold water at the hand wash basin facility?	2	2	
Is the hand wash basin clean?	2	1	Could be cleaner, dust bins lid broken
Is the hand wash basin easily accessible?	2	2	
Is there a supply of anti-bacterial hand soap at the hand wash basin?	2	1	Only available at one basin
Is there paper towels/dryer at the hand wash basin?	2	1	Only available at one basin
Are all work surfaces and utensils cleaned and sanitized between preparations?	2	0	No sanitizer like biocide available to clean before and during prep
Are good housekeeping practices evident?	2	1	Each staff member needs specific cleaning roster as well as proper chemicals to clean with, bins, mixer and plugs very dirty
Are floors in a good state of repair, clean, and is the finish appropriate?	2	1	Broken and cracked tiles, need to be replaced, plastic crates on floor
Are the floor drains/fat traps in a good state of repair?	2	1	Needs to be cleaned after each meal
Are the sinks clean (preparation and pot wash)?	2	0	Water very dirty, not sufficient chemicals available to clean pots with
Are the walls clean, and is the finish appropriate?	2	1	
Are the walls in a good state of repair?	2	2	
Are the windows clean?	2	1	Pot wash area – window dirty and one window cracked
Are the windows in a good state of repair?	2	1	One window cracked, need to be replaced

4. PREPARATION			
Is the ceiling clean and grease free?	2	2	
Is there appropriate ventilation/extraction over the main cooking island?	2	2	
Are the extractor canopy and the extraction grids clean and free of grease/dust build-up?	2	2	
Is the lighting in the preparation/production area adequate?	2	2	
Are all lights covered by clean diffusers/covers (no exposed fluorescent tubes)?	2	0	Need light covers
Is the production area equipment clean?	2	1	Needs cleaning schedule
Is the production equipment in a good state of repair – no exposed wiring etc.?	2	1	Needs maintenance schedule
Evidence of pests?	2	2	
General Comments:	Cleaning schedules, cleaning material, maintenance of equipment		
Total:	62	30	
Final Percentage:			48%

5. SERVICE / DISTRIBUTION			
Is food protected from cross-contamination during service?	2	2	
Is correct food handling techniques evident?	2	2	
If food preparation is taking place in this area, is there an adequate hand wash basin or hand sanitizer dispenser in place with the correct commodities?	2	0	Hand sanitizer needed, no plastic gloves
Are good housekeeping practices evident?	2	1	Update cleaning schedule
Are the floors clean?	2	1	
Are the walls clean?	2	2	
Are the windows clean?	2	1	
Is the ceiling clean?	2	2	
Is the lighting in the service/distribution area adequate and appropriate?	2	1	Needs a cover
Is the service equipment in a good state of repair?	2	1	Service band trip electricity
Is the service equipment in a clean and hygienic condition?	2	1	
Is fresh fruit washed and sanitized?	2	1	Sanitized with what?
Is crockery pre-heated to 30°C?	2	2	
Is all chipped/cracked crockery removed from service?	2	2	
Is the water in the hot Bain Marie clean?	2	1	Water should be replaced daily
Are there sufficient clean customer trays?	2	1	Enough trays – no disinfectant available to clean trays, tray liners form material – infection risk
Is there sufficient clean crockery?	2	2	
Evidence of pests?	2	2	
General Comments:	Disposable paper tray liners, Water in Bain Marie needs to be replaced, Fruit should be sanitised with approved sanitiser.		
Total	36	25	
Final percentage			69%

6. CUSTOMER AREA			
Are tables cleared and surfaces regularly cleaned with an anti-bacterial agent?	2	0	No cleaning schedule, no antibacterial spray or sanitizer available on site to clean with
Are the tray slide rails clean and free of grime build-up, grease and food spills?	2	0	Christmas decorations wrap around it, greasy
Is the sneeze guard protected glass in front of the Bain Marie, clean and free of food splatters?	2	0	No sneeze guard protected glass
Are all service area surfaces (marble, stainless steel etc.) clean and in a good state of repair?	2	1	Rusted, lots of unnecessary items lying around
Are the floors clean?	2	2	
Are the walls clean?	2	2	
Are the windows clean?	2	2	
Is the ceiling clean and in a good state of repair?	2	2	
Is the lighting in the customer area adequate and appropriate?	2	2	
Is the dining area furniture in a good state of repair?	2	2	
Evidence of pests?	2	2	
General Comments:	Microwave needs cleaning, protected glass shield needed in front of serving area, better house keeping needs to be implemented		
TOTAL	22	15	
Final Percentage			68%

7. PREMISES AND EQUIPMENT HYGIENE			
Is there a current pest control contract/service in place? (Verify records)	2	1	Contract with Craison, records need to be kept in file
Is the waste area in a clean and sanitized condition?	2	1	Puree all the left over food and fed through pipe out of kitchen
Are the grease traps clean and grease free?	2	1	Needs to be cleaned after each meal
Is fire fighting equipment correctly positioned/ placed? Does the equipment include a fire blanket?	2	1	Three bottles, one hose pipe and one blanket
Is the fire extinguisher service label available and relevant?	2	2	
Is there an emergency evacuation plan, and is it displayed?	2	2	
Is there an insectocutor with a catch tray?	2	1	Needs a catch tray
Is the insectocutor correctly positioned and clean?	2	1	
No domestic pesticide products should be used or found in storage – e.g. Doom, Baygon, Rattex etc.	2	2	
Are the correct chemicals used for sanitation/ cleaning processes?	2	0	Prestige – kitchen needs own chemical store, assistants can issue chemicals
Is the correct cleaning equipment used, and is it clean?	2	0	Prestige – kitchen needs own chemical store, assistants can issue chemicals
Are the correct chemical dilution rates used?	2	0	Prestige – kitchen needs own chemical store,

7. PREMISES AND EQUIPMENT HYGIENE			
			assistants can issue chemicals – better control over dilution of chemicals
Are cleaning plans and schedules for all areas evident, and are they adhered to?	2	0	No cleaning schedules or plans available
Do all food production/processing equipment have safety usage and cleaning instructions next to them?	2	0	No safety usage or cleaning instructions available
Is the water temperature of the dishwasher higher than 75°C	2	0	38C Washing Cycle and 24C Rinse, what soap and chemicals are they using?
Is the dishwasher clean inside and out, with clean debris filters?	2	2	
Are all kitchen smalls clean and sanitized?	2	1	Not sanitized
Are all kitchen smalls stored correctly?	2	1	
Does the pot wash have hot and cold water?	2	2	
Is a sanitization step in place during the manual washing process?	2	0	No sanitations step manual in place
Are chemical MSDS and user charts readily available for use?	2	0	Chemicals used by Prestige?
General Comments:	Chemical store needed, cleaning schedules, dilution rates?		
TOTAL	44	19	
Final Percentage			43%

8. STAFF STANDARDS			
Staff uniform as per policy?			
a) Are food handlers wearing headgear?	2	1	Chef not wearing headgear, one chef - material hat very dirty
b) Are food handlers wearing jewellery?	2	1	Ear rings
c) Are staff wearing the appropriate footwear?	2	1	Open shoes – sandals
d) Are staff wearing personal protective clothing?	2	1	Need to replace plastic apron and disposable hats each day
Are uniforms in a clean and hygienic condition?	2	1	Aprons of chefs dirty
Does staff practice good personal hygiene practices?	2	1	Needs training
Is staff with open or infectious wounds forbidden to work?	2	2	
Are staff leave records on file and current?	2	2	
Are adequate lockers available for storage of clothes and personal effects?	2	1	Lockers rusted and old
General Comments:	Material aprons need to be clean, paper chef hats, replace plastic aprons and disposable hats each day, no plastic gloves.		
TOTAL	18	11	
Final Percentage			61%

9. STAFF PREMISES			
N/A Client's Responsibility			
Are suitable sanitary facilities available?	2	0	One toilet for a lot of staff, shower not working, no shower curtain or door, hand dryer not working, lockers old and rusted, hole in ceiling, mirror broken.
Does the sanitary facility have hot and cold running water?	2	1	Shower no taps or water
Are there mirrors? Are they clean?	2	1	Mirror broken
Are all hand wash basins stocked with anti-bacterial hand soap?	2	0	No anti bacterial soap
Is there hand drying towels/dryer at the hand wash basin?	2	0	Hand dryer not working
General Comments:	Lockers needs to be repaired and painted, shower needs to be repaired, shower door need to be installed, ceiling needs to be repaired, hand dryer needs to be repaired, hand sanitizer and toilet paper should be available at all times for staff to use.		
TOTAL	10	2	
Final Percentage			20%

10. QUALITY PROCEDURES / RECORDS			
Is the Approved Product List (APL) on-site current?	2	0	
Are there current records of temperature monitoring for the following available?			
a) Daily temperatures monitored and recorded for chilled (0 to 4°C) and sub zero (-18°C) Storage?	2	0	
b) Cooking temperatures monitored daily and recorded (hot >80°C)?	2	0	
c) Prepared food holding units' temperatures monitored and recorded daily (hot >65°C) – food and counter? Including monitoring of pie warmer temperature?	2	0	
d) Prepared food holding units' temperatures monitored and recorded daily – chilled (0 to +4°C) – food and counter?	2	0	
e) Food distributed to satellites – temperatures controlled, monitored daily and recorded?			
Is the condition of the frying oil monitored weekly/ bi-weekly and recorded?	2	0	
Is the frying temperature of oil at 180°C to 190°C? The auditor to verify temperature and record any variances	2	0	
Are customers' complaints recorded and followed up?	2	1	Assistant catering manager does ward rounds on a daily basis; need to record complaints as well as action plans.

10. QUALITY PROCEDURES / RECORDS			
Are there daily inspection/checklists in use for all areas?	2	0	
Have improvement action points from previous audits been implemented?			First Audit
General Comments:	Temperature recordings need to be done and records should be kept, oil should be monitor according to standards.		
TOTAL	18	1	
Final Percentage			6%

SECTION 2			
2. OHS ACT COMPLIANCE			
2.1 Administration Documents			
2.1.1	Is there a copy of the current Occupational Health and Safety Manual on site?	2	2
2.1.2	Has the current manager completed the legal Compliance Questionnaire on a monthly basis?	2	0
2.1.3	Is there a copy of the Occupational Health and Safety Act of 1993 on site?	2	2
2.1.4	Are there signed copies of the Occupational Health and Safety Mandatory Letters of Appointment, are they current and on file? (Assistant to CEO 16(2) and Supervisor of Machinery)	2	2
2.1.5	Does the unit have a current Certificate of Food Premises Acceptability (Health Act 1977) displayed?	2	2
2.1.6	Is there a copy of the signed Induction Sheet?	2	0
2.2 Information for Employees : Confidential			
2.2.1	Is a copy of the OHS Act readily available	2	2
2.2.2	Has a minuted staff meeting been held in the last 12 months?	2	2
2.2.3	Is all company or legal signage present?		N.A
2.2.4	Are documented systems (e.g. Safe Working practices) regularly brought to the Attention of all staff? Verify	2	2
2.2.5	Are current hazards, changes and topics communicated to all staff? Copy of communication available for verification?	2	2
2.3. Risk Assessment			
2.3.1	Has a unit specific 'risk assessment' been conducted, documented and on file?	2	2
2.3.2	Are all safety representative checklists current and on record? (If Applicable)	2	2
2.3.3	Is a reactive response to action points evident?	0	N.A
2.3.4	Are specific unit hazards identified and properly controlled?	2	2
2.3.5	Is there a formal system for dealing with employee reported hazards?	2	2
2.4 Training			
2.4.1	Have all staff received induction training, is it documented and on file? Copies of	2	0

SECTION 2			
2. OHS ACT COMPLIANCE			
	training records to be kept on site even if originals are sent to Head Office.		
2.4.2	Has all specific training relevant to work activities been carried out?	2	2
2.4.3	Are the training records complete and up to date? Copies of training records to be kept on site even if originals are sent to HO.	2	0
2.4.4	Is Chat Pack/On-the-Job Training conducted on a regular basis? All three chat-pack modules must be available in the unit.	2	0
2.4.5	Is an On-the-Job/Chat Pack training attendance register kept?	2	0
2.5 Emergency Provisions			
2.5.1	Is there an adequate, correctly stocked First Aid Box available?	2	0
2.5.2	Is there an appointed, qualified First Aider (more than 10 employees) and Fire Marshall?	2	0
2.5.3	Is there an Emergency Evacuation Plan clearly communicated and displayed?	2	2
2.5.4	Is there an agreed Business Continuity Plan between Compass and the Client in the event that regular catering services have to be suspended?	2	0
2.5.5	Is all emergency equipment regularly tested and serviced? (e.g. Fire Extinguishers)	2	2
2.6 Equipment Safety			
2.6.1	Is all equipment properly maintained and in good condition?	2	2
2.6.2	Does all equipment have Safety User Instructions clearly displayed?	2	0
2.6.3	Is there an appointed Health and Safety Representative (more than 20 employees on site)?	2	2
2.6.4	Is there a documented Request for Maintenance system in place? Verify records	2	2
2.6.5	What evidence of supervision/training is available for equipment usage/safety? Verify training records	2	0
2.7 Accident Prevention and Recording			
2.7.1	Do all units have a copy of Annexure 2, Incident Report Format, current and on file (as per OHS Manual, Section F, Page 46)?	2	2
2.7.2	Is there evidence that accident reports provoke corrective actions?	2	2
2.7.3	Has all staff received formal Health and Safety Training? Records available for review?	2	0
2.7.4	Are fire alarms installed and in working order where applicable? Fire alarm should be able to be activated from Kitchen	2	2
2.7.5	Are 'near misses' recorded/reported?	2	2
2.8 Personal Protective Equipment (PPE)			
2.8.1	Is all PPE (e.g. gloves, masks, aprons etc?) available in a specified storage area?	2	0

SECTION 2			
2. OHS ACT COMPLIANCE			
2.8.2	Does the unit risk assessment clearly specify when and what PPE is required?	2	2
2.8.3	Have all staff been trained in the use of PPE and what their responsibilities are?	2	0
2.8.4	Are there spare sets of PPE available?	2	0
2.8.5	Is a register kept of all PPE issued to Catering staff?	2	0
2.9 Staff Conditions			
2.9.1	Is an attendance register available, current and updated?	2	2
2.9.2	Is the provision of a staff sanitary facility convenient and adequate?	2	0
2.9.3	Is each workplace in compliance with the requirements of the OHS Act/Health Act (lighting, ventilation, water supply etc)?	2	2
2.9.4	Are all staff with known illnesses removed from duty or isolated from food preparation areas?	2	2
2.10 Monitoring and Review			
2.10.1	Does the unit have copies of previous Occupation Health and Safety Review Reports on file?	2	2
2.10.2	Are there effective improvement action plans in use?	2	0
2.10.3	Is Health and Safety a fixed agenda item on all staff meeting agenda's?	2	0
2.10.4	Has an external audit been carried out at any time – e.g. NOSA Grading?	2	0
2.10.5	Have procedures/practices been updated following the previous audit?	2	2
General Comments:			
TOTAL		98	56
Final Percentage			57%

DATE OF AUDIT: 20/12/05

MICROBIOLOGICAL INDEX ACHIEVED

SURFACE SWABS

Area	Result per 25cm ²	Score	Target Score	Description
Equipment storage	0	2	2	Microwave knobs, ward kitchen
Equipment storage	>1000	0	2	Patient tray, distribution area, hospital kitchen
Equipment storage	>1000	0	2	Chopping board, salad and sandwich area
Control	0-100cfu/cm2 >100cfu/cm2	2 0	2 2	
<u>Comments: Tray Swab:</u> Coliforms >1000cfu/25cm2 E.coli = 870 cfu/25cm2 <u>Chopping Board:</u> Coliforms > 1000cfu/25cm2 E.coli = 350cfu/25cm		2	6	33%

HAND SWABS				
Area	Result per 25cm ²	Score	Target Score	Description
Hand swab 1 - Total count	0	2	2	Chef, plastic hand gloves
- Coliforms	0	2	2	
- E.coli	0	2	2	
Control	0-100cfu/cm2	2	2	
	>100cfu/cm2	0	2	
		6	6	100%

FOOD SAMPLES			
Sample 1:			
Area:	Chef's preparation area		
Location:	Plastic tray		
Supplier / In-House:	In house		
Cooked / Pre-Cooked / Raw / Ready to eat:	Category 6		
Temperature:			
Will Product undergo further processing to reduce microbial load, e.g. Cooking? (Y or N)	No		
Sample 1:	Result	Score	Comments
Total Count (cfu/g)	18700	2	
Coliforms (cfu/g)	30	2	
E.coli (cfu/g)	None Detected	2	

FOOD SAMPLES			
Staphylococcus aureus (cfu/g)		None	2
Salmonella spp. /25g		Absent	2
Sample Score			100%
Sample 2:			
Area:			
Location:			
Supplier / In-House:			
Cooked / Pre-Cooked / Raw / Ready to eat:		Category 4	
Temperature:		Cooked items before cooling	
Will Product undergo further processing to reduce microbial load, e.g. Cooking? (Y or N)			
No			
Sample 2:		Result	Score
Total Count (cfu/g)		490	2
Coliforms (cfu/g)		None detected	2
E. coli (cfu/g)		None detected	2
Staphylococcus aureus (cfu/g)		None detected	2
Salmonella spp. /25g		Absent	2
Sample Score			100%
Sample 2:			
Area:			
Location:			
Supplier / In-House:			
Cooked / Pre-Cooked / Raw / Ready to eat:		In house	
Temperature:		Bain Marie	
Green Beans and Potatoes			
Cooking area			
Bain Marie			
In house			
Cooked items before cooling		Category 4	
No			
Sample 2:		Result	Score
Total Count (cfu/g)		490	2
Coliforms (cfu/g)		None detected	2
E. coli (cfu/g)		None detected	2
Staphylococcus aureus (cfu/g)		None detected	2
Salmonella spp. /25g		Absent	2
Sample Score			100%
Sample 3:			
Area:			
Location:			
Supplier / In-House:			
Cooked / Pre-Cooked / Raw / Ready to eat:		In house	
Temperature:		Stainless Steel Container	
Chicken Gravy			
Chef's preparation area			
In house			

FOOD SAMPLES			
Cooked / Pre-Cooked / Raw / Ready to eat:	Category 8		Cooked
Temperature:			
Will Product undergo further processing to reduce microbial load, e.g. Cooking? (Y or N)	Yes – will be reheated		
Sample 1:	Result	Score	Comments
Total Count (cfu/g)	12700	0	
Coliforms (cfu/g)	2760	0	
E.coli (cfu/g)	280	0	
Staphylococcus aureus (cfu/g)	None Detected	2	
Salmonella spp. /25g	Absent	2	
Sample Score		40%	
Sample 4:	Cold Processed Meat		
Area:	Salad Area		
Location:	Dinner Plate		
Supplier / In-House:	?		
Cooked / Pre-Cooked / Raw / Ready to eat:	Category 3		Cooked items before cooling
Temperature:			
Will Product undergo further processing to reduce microbial load, e.g. Cooking? (Y or N)	No		
Sample 2:	Result	Score	Comments
Total Count (cfu/g)	1220	2	
Coliforms (cfu/g)	190	2	
E.coli (cfu/g)	30	0	
Staphylococcus aureus (cfu/g)	None	2	

FOOD SAMPLES			
	detected		
Salmonella spp. /25g	Absent	2	
Sample Score		80%	
Total Sample Score		80%	

SCORING GUIDELINES					
Product Category	1	2	3	4	
Organism	Maximum Allowable Limit (cfu/g)	Maximum Allowable Limit (cfu/g)	Maximum Allowable Limit (cfu/g)	Maximum Allowable Limit (cfu/g)	Swabs 0-100cfu/25cm ² = 2 points, >100 cfu/25cm ² = 0 points Presence of Coliform on hand swabs = 0
Total Count (cfu/g)			<200000	<100000	
Coliforms (cfu/g)	10000	<200	<200	<10	
E.coli (cfu/g)	<10	Absent	Absent	Absent	
Staphylococcus aureus (cfu/g)	Absent	Absent	Absent	Absent	
Salmonella spp./25g	Absent in 25g	Absent in 25g	Absent in 25g	Absent in 25g	

PRODUCT CATEGORY	5	6	7	8	
Organism	Maximum Allowable Limit (cfu/g)	Maximum Allowable Limit (cfu/g)	Maximum Allowable Limit (cfu/g)	Maximum Allowable Limit (cfu/g)	Swabs 0-100cfu/25cm ² = 2 points, >100 cfu/25cm ² = 0 points Presence of Coliform on hand swabs = 0
Total Count (cfu/g)	<50000	<20000	1000000	<10000	
Coliforms (cfu/g)	<50	<50	10	<100	
E.coli (cfu/g)	Absent	Absent	Absent	Absent	
Staphylococcus aureus (cfu/g)	Absent	Absent	Absent	Absent	
Salmonella spp./25g	Absent in 25g	Absent in 25g	Absent in 20g	Absent in 20g	

Category 1 Definition:

Items requiring further cooking: blanched and frozen vegetables, half-cooked meal (also steak, chops and wors), meat basting sauce and raw meat.

Category 2 Definition:

Raw vegetables and raw fruits including fresh fruit salad, salad dressing and peanut butter.

Category 3 Definition:

Cold meal items: cold meats, processed meats e.g. Vienna's, polony, dried vegetables, ham and potato salad with mayonnaise.

Cold smoked or fermented items: salami, bacon, buns, bread, smoked cold meat and caviar.

Category 4 Definition:

Cooked items before cooling: pastry, bulk vegetables, deep fried potato chips, pizzas, ready-to-eat frozen meals, tinned jam, tinned vegetables and fat cakes.

Category 5 Definition:

Dairy products or composite dairy products

Category 6 Definition:

Egg and egg products

Category 7 Definition:

Cooked freshwater and sea water products: prawns, shrimps, crayfish, lobsters, crab meat, oysters, clams, mussels, eels and fish

Category 8 Definition:

Cooked poultry

(Reference: Regulations Governing Microbiological Standards for Foodstuffs and Related Matters (R.692 of May 1997))

ADDENDUM B

MICRO REFERENCES:

1 TP 001 Determination of Total Aerobic Plate Count:

- ISO 4833:1991: Enumeration of microorganisms – colony count technique at 30 °C.
- ISO 6887:1983: General guidance for the preparation of dilutions for microbiological examination.
- ISO 7218:1985: General guidance for microbiological examinations.
Merck Microbiology Manual
Method 1TP: 002
Media Used: Plate Count Agar ART: C6

1TP 002 Preparations of Dilutions:

- ISO 6887 – 1983: General guidance for the preparation of dilutions for microbiological examination.
- ISO 7218 – 1985: General guidance for microbiological examinations.
Oxoid Microbiology Manual
Diluent Used : Maximum Recovery Diluent CM733

1 TP 003 Enumeration of Coliforms – Colony Count Technique:

- ISO 4832 – 1991 Part 2.: Enumeration of Coliforms – Colony Count Technique
- ISO 7218 – 1985: General guidance for microbiological examinations.
Method 1TP: 002
Media Used: Chromocult 1.10426

1 TP 004 Enumeration of Presumptive Escherichia Coli:

- ISO 6887 – 1983 General guidance for the preparation of dilutions for microbiological examination.
- ISO 7218 - 1985 General guidance for microbiological examinations.
Merck Microbiology Manual
Method 1TP: 002
Media Used: Chromocult 1.10426

1 TP : 012 Enumeration Of Staphylococcus Aureus

- ISO 6888: 1983 Part 7: Enumeration of staphylococcus aureus – colony count technique
- ISO 6887: 1983: General guidance for the preparation of dilutions for microbiological examination
- ISO 7218: 1985: General guidance for microbiological examinations
Supplements: 1% sterile potassium tellurite solution (BX5) & Egg Yolk Emulsion (BX14)
Oxoid Microbiological Manual
1TP: 002

Media Used: Baird – Parker Agar base

1 TP: 018 Procedure for detection of Salmonella

ISO 6563: 1993

BS 5763 Part 4: 1993

Merck Microbiological Manual

Oxoid Microbiological Manual

1TP: 002

Media Used: Buffered peptone Water CM509

Rappaport – Vassiliadis Enrichment Broth CM669

X.L.D Medium CM469

1 TP : 020 Procedure for Swab Technique

SABS Method 763

Merck Microbiological Manual

Oxoid Microbiological Manual

Media Used: Buffered Peptone Water CM509

Hygiene	2.2.1 Main Fridge	Not up to standard	
	CCP	1. Cleaning Schedule 2. Check-list of cleaning schedule 3. Training on hygiene and storage methods of food	Check-list signed by C.M. & Assistant Managers Training card signed by C.M. and Assistant Managers
Staff Procedures	Not up to standard	Food stored on floor Boxes opened, torn packaging Not all the containers or boxes labelled with packaging date Goods returned - no "used by" dates No food samples available Better cross contamination rules should be practiced Jams tins were opened 1. More plastic containers needed (order some) 2. Implement rotation system 3. All the boxes or packages should be labelled with packaging date 4. Goods returned - label with "used by" date 5. Goods returned should be sealed with Glad Wrap 6. Tinned food should be transferred in appropriate containers with a packaging date on 7. Food samples should be kept for 72h - 25g of food needed	
	Maintenance	Shelves rusted 1. Paint shelves 3.1 Freezer	Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C.M.)
CCP	Not up to standard	3.1 Freezer	
	Hygiene	Floor slippery and iced 1. Defrost cold room - remove build up of ice 2. Cleaning Schedule Daily Weekly Monthly	Part of cleaning schedule, should be signed by C.M. and Assistant Manager or Store Lady
Staff Procedures	Not up to standard	Monthly	
	CCP	Boxes opened, freeze bite on food No labelling with packaging date Refreezing has being practiced Butter rotation system needed 1. Training on storage of food 2. Training on food labelling 3. Forbidden Process Policy 4. Implement better rotation system & give training to 5. Complete Temperature Control Sheets for frozen food	Training cards should be signed after training, only Catering Manager and Assistant Manager allowed in cold room. When food is delivered required labelling should be done, sign training cards after training is completed. Training for all kitchen staff on Forbidden Process Policy, Catering Manager and Assistant Managers Temperature of two frozen foods should be recorded daily, file these sheets
Maintenance	Not up to standard	Front rubber strip missing	Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C.M.)
	CCP	3.2 Chemical Store 1. Replace front rubber strip	Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C.M.)
Hygiene	Not up to standard		
	CCP	1. Cupboard or store-room should be appointed for storage of chemicals 2. Chemicals should be stored separately from food 3. Chemical storage area should be well ventilated	Regular company supplies chemicals Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C.M.)
Staff Procedures	Not up to standard	No chemical store-room or cupboard in kitchen - cleaning company supplies chemicals	Regular company supplies chemicals
	CCP	1. Chemicals should be available to all kitchen staff in 2. Training on dilution and use of different chemicals	Assistant C.M. should dispense chemicals before the start of morning shift/plastic containers & spray bottles Training to all kitchen staff on the chemicals used - sign training cards after training is completed
Maintenance	Not up to standard	No chemical store-room or cupboard	
	CCP	1. Obtain a cupboard that can lock for the storage of chemicals 2. Apply at maintenance for a cupboard that could store chemicals - should be able to lock	

Action Plan for HACCP Implementation			
Control	Implementation Date	Check-list	
1. Receiving Area	Not up to standard		
CCP	1. Cleaning Schedule Mop Heads Scale Floor Walls	Check list signed daily by C/M and Assistant Manager	
	2. Check list of cleaning schedule Weekly Monthly Daily	Training cards signed by C/M, Chef and Assistant Manager	
	3. Training - hygiene	File training records of each staff member	
	4. Design Training Cards		
Staff Procedures	Not up to standard		
CCP	Company receiving procedure Temp checks on perishable food Not all the food labelled with expiry date Quality checks on food 1. Order poster displaying receiving procedures of company 2. Training - receiving procedures 3. Expiry date labels on all perishable foods 4. Design Temp Check Sheets	Stick on wall at receiving area Check list signed daily by C/M and Assistant Manager Order labels should be at receiving area with permanent marker Temp Check sheets should be signed by C/M as well as chef or A/M	
Maintenance	Not up to standard		
	1. Replace chipped tiles Tiles chipped		
	2. Storage Area 2.1 Dry Storage	Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C/M)	
Hygiene	Not up to standard		
CCP	Storage containers dirty Some storage containers not sealed Shelves dirty Plastic name tags look untidy 1. Cleaning Schedule Daily Weekly Monthly 2. Check-list of cleaning schedule Seal all the containers 3. Training Assistant Managers, Catering Manager and Store Lady 4. Remove plastic name tags	Check-list signed daily by C/M and Assistant Manager Part of check-list Training cards signed by C/M, Assistant Managers and Store Lady File training records of each staff member Organize stock in sections: Starches, Tea and Coffee, Tinned products etc.	
Staff Procedures	Not up to standard		
CCP	No stock rotation Some boxes not labelled with packaging date Stock stored on floor Goods used - no "used by" date on Opened tin of mustard No ambient air temperature recorded 1. Training on stock rotation 2. Training on labelling packaging date 3. Training on labelling "used by" date 4. Training on placing used food in sealed container 5. No stock allowed on floor 6. Temp recording of ambient air temp	Training cards signed by C/M, Assistant Managers and Store Lady Training cards signed by C/M, Assistant Managers and Store Lady Part of cleaning schedule, should be signed by C/M and Assistant Manager or Store Lady Ambient air temp recording sheets - filled in three times a day and filed	
Maintenance	Not up to standard		
CCP	1. Paint shelves Shelves rusted	Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C/M)	
2.2 Refrigerated Storage	2.2.1 Main Fridge		
Not up to standard			
Hygiene	Not up to standard		
CCP	1. Cleaning Schedule No cleaning schedule		

Action Plan for HACCP Implementation

4. Preparation/Production	Control	Implementation date	Check-list
Not up to standard			
<p>Hand-wash basin dirty</p> <p>No antibacterial soap at basin</p> <p>Paper towels or hand-wash dryers - only available at one basin</p> <p>No antibacterial soap or disinfectant available to clean utensils and work surfaces</p> <p>No cleaning schedule at each section of prep and production area</p> <p>Water at pot wash area very dirty & dilution of cleaning agents not correct</p> <p>1. Cleaning Schedule</p> <p> Daily</p> <p> Weekly</p> <p> Monthly</p> <p>2. Implement distribution of disinfectants at the start of the morning shift</p> <p>3. Training - use of disinfectant, importance of cleaning of work surfaces and utensils</p> <p>4. Antibacterial soap and paper towels/hand-wash dryers at each hand-wash basin</p>	<p>Check-list signed daily by CM and Assistant Manager</p> <p>Check-list signed daily by CM and Assistant Manager</p> <p>Training cards signed by C.M, kitchen staff and Assistant Manager</p> <p>Check-list signed daily by CM and Assistant Manager</p>		
Not up to standard			
<p>Thawing of food</p> <p>Defrosting not done under controlled conditions</p> <p>Cross-contamination not avoided at all stages of food production</p> <p>Perishable foods should be kept in cold room prior to use</p> <p>No temperature control points during production</p> <p>1. Training on correct thawing procedures</p> <p>2. Training on cross contamination and the risks involved</p> <p>3. Implementation of prep and cooking schedule for daily menu</p> <p>4. Implement temperature control points</p>	<p>Training cards signed by C.M, kitchen staff and Assistant Manager</p> <p>Training cards signed by C.M, kitchen staff and Assistant Manager</p> <p>Cooking schedules should be implemented</p> <p>Thermometers for respective control points and temperature control sheets</p>		
Not up to standard			
<p>Tiles chipped</p> <p>Window at pot wash area cracked</p> <p>Lights in production area need light covers</p> <p>1. Replace chipped tiles</p> <p>2. Replace cracked window</p> <p>3. Fit lights with light-covers</p>	<p>Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C.M)</p> <p>Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C.M)</p> <p>Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C.M)</p>		

Flow Diagram HACCP			
	Control	Implementation	Check List
Hygiene	5. Service/Distribution Area Not up to standard Water in Bain Marie Floors Windows Customer trays and material tray liners 1. Cleaning Schedule Daily Weekly Monthly 2. Check list of cleaning schedule 3. Training - Cleaning and sanitation 4. Design Limited Cardit Not up to standard Hands of staff still wearing plastic hand gloves No temperature checks on food at service area Fresh fruit not washed and sanitised 1. Implement use of hand sanitizer and stop use of hand gloves 2. Training on the importance of the use of hand sanitizer 3. Implement temperature control sheets and use of thermometer 4. Implement use of sanitizer when washing the fruit Not up to standard Lights in service area need light covers Service band taps electricity 1. Fit lights with light covers 2. Service band repair 6. Customer Area Not up to standard	Check list signed daily by CM and Assistant Manager Training cards signed by C.M. Chef and Assistant Manager File training records of each staff member Training cards signed by C.M and staff member Temperature control sheets Daily cleaning schedule - check list Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C.M) Implement maintenance roster for all the equipment	
CCP	Tables Tray slide rails Service area surfaces 1. Cleaning Schedule Daily Weekly Monthly 2. Remove Christmas decorations from rails 3. Remove all unnecessary items at service area Not up to standard No stock rotation Not up to standard Sneeze guard protection needed in front of Bain Marie Shelves rusted 1. Initial sneeze guard protection in front of Bain Marie 2. Repair rusted shelves 7. Premises and Equipment Hygiene Not up to standard Waste area Waste bins Grease traps Incinerator dish.	Daily cleaning schedule checklist signed by C.M or Assistant C.M Check list signed daily by CM and Assistant Manager Part of check list Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C.M) Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C.M)	
Staff Procedures			
Maintenance			
CCP			
Hygiene			

Hygiene	7. Premises and Equipment Hygiene		
	Not up to standard		
CCP	Waste area		
	Waste bins		
	Grease traps		
	Insectocutor dirty		
CCP	No cleaning schedule		
	1. Cleaning Schedule		
	Daily		
	Weekly		
Staff Procedures	2. Check list of cleaning schedule		
	3. Training on basic hygiene and use of cleaning agents		
Maintenance	Not up to standard		
	Not up to standard		
CCP	Fire fighting equipment		
	Insectocutor needs catch tray		
	1. Order two fire blankets		
	2. Fit insectocutor with a catch tray		
Hygiene	Premises and Equipment Hygiene		
	Not up to standard		
CCP	No cleaning schedule or plans		
	No safety usage and cleaning instructions at equipment		
	Water temperature of dish washer - 38°C		
	No chemical MSDS and user charts available		
CCP	1. Cleaning Schedule		
	Daily		
	Weekly		
	Monthly		
Staff Procedures	2. Complete safety usage and cleaning instructions for equipment		
	3. Replace dish washer or install new temperature control unit		
	4. Get hold of MSDS and user charts		
	Not up to standard		
CCP	Use of correct chemicals v/s sanitation		
	Use of correct cleaning equipment		
	Kitchen smells are not sanitized		
	Kitchen smells are not stored correctly		
CCP	No sanitation step in place during manual washing process		
	1. Training on correct chemical use and dilution ratios		
	2. Training on correct cleaning of equipment		
	3. Cleaning Schedule		
Maintenance	Daily		
	Weekly		
	Monthly		
	Not up to standard		
CCP	Water of dishwasher between 24°C and 38°C		
	1. Replace dishwasher or temperature control section of dishwasher		

Check list signed by C.M & Assistant Managers
Training card signed by C.M and Assistant Managers

Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C.M)
Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C.M)

Cleaning schedule, daily check list should be signed by CM or Assistant C.M

Place cleaning instructions and safety instructions close to equipment
Daily checklist - signed by CM or Assistant CM
File MSDS and user charts

Training cards should be signed after training
Training cards should be signed after training, daily cleaning checklist, cleaning instructions next to equipment
Daily cleaning checklist, should be signed by Catering manager or Assistant C.M

Regular inspections - outside audits (every 3rd month) and Compliance Questionnaire - monthly (C.M)

Flow Diagram HACCP

10. Quality Procedures/Records

Not up to standard

1. No Approved Product List (APL)

2. No temperature monitoring done

* Daily chilled (0 to 4°C) and sub-zero (-18°C) storage

* Daily with each meal - cooking temperatures (hot > 80°C)

* Daily - prepared food holding units' temperatures (hot > 65°C)

* Frying oil not monitored (weekly or bi-weekly), no recordings done

Recommended temperature 180 -190 °C

3. Customers' complaints not recorded on a daily basis

4. No daily inspections or check-lists in place

Action Plan

1. HACCP approved suppliers should be used, APL list should be available

2. Temperatures of chilled and sub-zero store-room should be recorded twice a day

Daily recording of cooking temperatures for all the dishes should be done

Hot holding temperatures for each dish should be recorded during meal times

Frying oil should be monitored at least once per week

3. Customers' complaint book should be implemented with action plans

4. Daily inspections and check-lists of food service management's responsibilities, should be included.

Control

APL List should be available on file

Daily temperature recording sheets

Daily temperature recording sheets

Daily temperature recording sheets

Daily temperature recording sheets

Daily temperature recording sheets

Weekly frying oil temperature recording sheet

Customer complaint book

Daily check-list for different kitchen areas

Should be signed by CM

Implementation Date

Check list

ADDENDUM D

TECHNICAL DOCUMENTATION:

* *Templates of technical documentation available from author*

Perishable goods received record

PERISHABLE GOODS RECEIVED TEMPERATURE RECORD									
CONTRACTS: _____			CONTRACT CODE: _____			MONTH: _____			
DATE	SUPPLIER	COMMODITY RECEIVED	COMMODITY IS		TIME OF TEST/DELIVERY	TEMP AT TEST MEASURE IN °C	GOODS RETURNED YES/NO	DRIVER SIGNATURE	SIGNATURE OF AUTHORISED MANAGER
			SUB ZERO YES/NO	CHILLED YES/NO					

STANDARDS	
SUB ZERO	CHILLED
Above -18°C for ice cream	Below 4°C - Fresh Meat, Milk, Fish & Dairy
Above -12°C for any other frozen item	Below 6°C - Other chilled/perishable products

Please note:

- No ticks or crosses allowed
- No pencil allowed
- No tipex allowed

Cooking oil test and consumption record

COOKING OIL TEST AND CONSUMPTION RECORD

CONTRACT: _____

CONTRACT CODE: _____

MONTH: _____

WEEK 1					
DATE OF TEST	OIL BIN	TIME OF TEST	TEST RESULT	ACTION TAKEN	SIGNATURE OF AUTHORISED MANAGER
	1				
	2				
	3				
	4				

WEEK 2					
DATE OF TEST	OIL BIN	TIME OF TEST	TEST RESULT	ACTION TAKEN	SIGNATURE OF AUTHORISED MANAGER
	1				
	2				
	3				
	4				

WEEK 3					
DATE OF TEST	OIL BIN	TIME OF TEST	TEST RESULT	ACTION TAKEN	SIGNATURE OF AUTHORISED MANAGER
	1				
	2				
	3				
	4				

WEEK 4					
DATE OF TEST	OIL BIN	TIME OF TEST	TEST RESULT	ACTION TAKEN	SIGNATURE OF AUTHORISED MANAGER
	1				
	2				
	3				
	4				

WEEK 5					
DATE OF TEST	OIL BIN	TIME OF TEST	TEST RESULT	ACTION TAKEN	SIGNATURE OF AUTHORISED MANAGER
	1				
	2				
	3				
	4				

OIL USAGE RECONCILIATION				Please note: * No ticks or crosses allowed * No pencil allowed * No tipex allowed * All changes must be initialed
	DATE	LITRES	VALUE	
OIL IN STOCK AS AT				
OIL PURCHASED				
OIL ISSUED				
CLOSING STOCK AS AT				
OIL CONSUMPTION				
OIL IN USE				
OIL SENT OF SITE				
VARIANCE				
% OF TOTAL				

OIL TEST STANDARD	
DAILY	WEEKLY
COL TEST BELOW TYPE 4	OXIFRIT TEST STANDARD IS BELOW GREEN

Refrigerator temperature record

REFRIGERATOR TEMPERATURE RECORD

CONTRACT: _____ CODE: _____ MONTH: _____ LOCATION: _____

DATE	07H00		13H00		19H00		ACTION / R & M REQUEST NUMBER	SIGNATURE OF AUTHORIZED MANAGER
	TIME	TEMP	TIME	TEMP	TIME	TEMP		
1st								
2nd								
3rd								
4th								
5th								
6th								
7th								
8th								
9th								
10th								
11th								
12th								
13th								
14th								
15th								
16th								
17th								
18th								
19th								
20th								
21st								
22nd								
23rd								
24th								
25th								
26th								
27th								
28th								
29th								
30th								
31st								

STANDARDS	
Below 4°C	Fresh Meats, Milk, Fish & Dairy
Below 6°C	Any other chilled/perishable products

PLEASE NOTE:
• No ice or crushed ice allowed
• No paper allowed
• No paper allowed
• All changes must be recorded

Freezer temperature record

FREEZER TEMPERATURE RECORD

CONTRACT: _____ CODE: _____ MONTH: _____ LOCATION: _____

DATE	07H00		13H00		19H00		ACTION / R & M REQUEST NUMBER			SIGNATURE OF AUTHORISED MANAGER		
	TIME	TEMP	TIME	TEMP	TIME	TEMP	07H00	13H00	19H00	07H00	13H00	19H00
1st												
2nd												
3rd												
4th												
5th												
6th												
7th												
8th												
9th												
10th												
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22nd												
23rd												
24th												
25th												
26th												
27th												
28th												
29th												
30th												
31st												

STANDARDS	
Above -18°C	Above -12°C
Ice Cream	Any other frozen product

Please note:
* No ticks or crosses allowed
* No pencil allowed
* No ink allowed
* All changes must be initialed

Food retention samples prior to service or distribution

FOOD RETENTION SAMPLES PRIOR TO SERVICE OR DISTRIBUTION

CONTRACT: _____

CODE: _____

MONTH: _____

DATE	FOOD SAMPLES TAKEN FOR												REPORTED INCIDENTS YES/NO	ACTION TO BE TAKEN	SIGNATURE OF AUTHORISED MANAGER
	PROTEIN			STARCH			VEGETABLE			SALADS					
	YES/NO	TEMP		YES/NO	TEMP		YES/NO	TEMP		YES/NO	TEMP		YES/NO	TEMP	
1st															

1st															
2nd															
3rd															
4th															
5th															
6th															
7th															
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27th															
28th															
29th															
30th															
31st															

- SAMPLES MUST BE:**
- 1) Stored below 4°C in a dedicated area
 - 2) Samples must be stored in sterile, disposable containers i.e. sachet or ziplog bags
 - 3) Samples must be retained for 72 hours
 - 4) Samples must be labelled (Product name, date, time, temperature)
 - 5) Sample products prior to service/distribution
 - 6) Samples must be sampled with clean, sanitised utensils

Please note:
• No ticks or crosses allowed
• No pencil allowed
• No eraser allowed
• All changes must be initialed

Hot food holding temperature record

HOT FOOD HOLDING TEMPERATURE RECORD

CONTRACT: _____

CODE: _____

MONTH: _____

DAY: _____

BREAKFAST LUNCH DINNER FUNCTION

LOCATION OF HOT CLOSET/BAIN MARIE / HOT TOP: _____

MENU ITEMS	CORE TEMP (C) & TIME AT TEST				TO STANDARD YES / NO			ACTION TAKEN	SIGNATURE OF AUTHORIZED MANAGER
	PRIOR TO SERVICE(1)		DURING SERVICE(2)		END OF SERVICE(3)		3		
	TEMP	TIME	TEMP	TIME	TEMP	TIME			
	TEMP	TIME	TEMP	TIME	TEMP	TIME			
OTHER SPECIFY									
SOUPS & SAUCES									
VEGETABLES									
STARCHES									
PROTEINS									

STANDARDS
ABOVE 80°C . SURFACES : WATER / INSIDE CLOSETS
MIN ABOVE 65°C . CORE TEMPERATURE OF FOOD
HOT FOOD TO BE STORED NO MORE THAN 4 HOURS

Please note:
* No ticks or crosses allowed
* No pencil allowed
* No tape allowed
* All changes must be initialed

Hot food distribution temperature record

HOT FOOD DISTRIBUTION TEMPERATURE RECORD

CONTRACT: _____ CODE: _____

LOCATION OF SATELLITE UNIT: _____ DATE: _____

BREAKFAST LUNCH DINNER FUNCTION

MENU ITEMS SENT	PRIOR TO DISTRIBUTION		ACTION TAKEN	AUTHORISED MANAGER SIGNATURE	RECEIPT AT SATELLITE UNIT		ACTION TAKEN	AUTHORISED MANAGER SIGNATURE
	STANDARD	YES/NO			TIME	TEMP(C)		
OTHER SPECIFY								
SOUP & SAUCES								
VEGETABLES								
STARCHES								
PROTEINS								

STANDARDS

ABOVE 60°C - SURFACES / WATER / INSIDE CLOSETS

MIN ABOVE 95°C - CORE TEMPERATURE OF FOOD

HOT FOOD TO BE STORED NO MORE THAN 4 HOURS

Please note:

- No ticks or crosses allowed
- No pencil allowed
- No lines allowed
- All changes must be initialed

COLD FOOD DISTRIBUTION TEMPERATURE RECORD

CODE

DATE: _____

FUNCTION

[illegible]

STANDARDS

BETWEEN -14C TO 21C SURFACE ENCLOSURES

MAXIMUM BELOW 41C CORE TEMPERATURE OF FOOD

COLD FOOD TO BE STORED NO MORE THAN 2 HOURS

COLD FOOD TO BE STORED NO MORE THAN 2 HOURS

MAXIMUM BELOW 4°C CORE TEMPERATURE OF FOOD

BETWEEN -1°C TO 2°C SURFACE ECLOSSETS

STANDARDS

Please note:

- No ticks or crosses allowed
- No pencil allowed
- No time allowed
- All changes must be initiated

Cold food holding temperature record

COLD FOOD HOLDING TEMPERATURE RECORD

CONTRACT: _____

CODE: _____

MONTH: _____

DAY: _____

BREAKFAST LUNCH DINNER FUNCTION

LOCATION OF HOT CLOSET/BAIN MARIE / HOT TOP: _____

MENU ITEMS	CORE TEMP (°C) & TIME AT TEST								TO STANDARD YES / NO	ACTION TAKEN	SIGNATURE OF AUTHORISED MANAGER
	PRIOR TO SERVICE(1)		DURING SERVICE(2)		END OF SERVICE(3)		TEMP	TIME			
	TEMP	TIME	TEMP	TIME	TEMP	TIME					
OTHER SPECIFY	SOUPS & SAUCES		VEGETABLES		STARCHES		PROTEINS				
	TEMP	TIME	TEMP	TIME	TEMP	TIME	TEMP	TIME			

WASTE RECORD of PREPARED FOOD

WEEK 1								
DATE	PREPARED FOOD TO BE BINNED BY KG					ESTIMATED VALUE RANDS PER KG	ACTION TO BE TAKEN TO REDUCE WASTAGE	SIGNATURE OF AUTHORISED MANAGER
	BREAKFAST	LUNCH	DINNER	SHACKS	OTHER			
TOTAL								
TOTAL CONSUMPTION %								

[illegible][illegible][illegible]

WEEK 6								
DATE	PREPARED FOOD TO BE BINNED BY KG					ESTIMATED VALUE RAND'S PER KG	ACTION TO BE TAKEN TO REDUCE WASTAGE	SIGNATURE OF AUTHORISED MANAGER
	BREAKFAST	LUNCH	DINNER	SNACKS	OTHER			
TOTAL								
TOTAL CONSUMPTION %								

MONTH SUMMARY						STANDARD	
WEEK	PREPARED FOOD TO BE BINNED BY KG					ESTIMATED VALUE RANDS PER KG	BELOW 1% OF TOTAL CONSUMPTION
	BREAKFAST	LUNCH	DINNER	SNACKS	OTHER		NB: EXCLUDES PREPARATION WASTE AND PLATE WASTE
1							Please note: <ul style="list-style-type: none"> No ticks or crosses allowed No pencil allowed No tipex allowed All changes must be initiated
2							
3							
4							
5							
TOTAL							
TOTAL CONSUMPTION							
K							

109

Sanitising dilution rates – buckets

SANITISING DILUTION RATES - BUCKETS

CONTRACT: _____
 CONTRACT CODE: _____
 MONTH: _____

DATE	AREA	CORRECT DILUTION		ACTION TO BE TAKEN (ONLY APPLICABLE IF NO)	SIGNATURE OF PERSON TESTING DILUTION RATES	SIGNATURE OF AUTHORISED MANAGER
		YES	NO			
1st						
2nd						
3rd						
4th						
5th						
6th						
7th						
8th						
9th						
10th						
11th						
12th						
13th						
14th						
15th						
16th						
17th						
18th						
19th						
20th						
21st						
22nd						
23rd						
24th						
25th						
26th						
27th						
28th						
29th						
30th						
31st						

STANDARDS
 1 Sachet of Sanitiser with 10l of water according to
 manufacturers instructions

Please note:
 • No ticks or crosses allowed
 • No pencil allowed
 • No tipex allowed
 • All changes must be initialed

Sanitising dilution rates – spray bottles

SANITISING DILUTION RATES - SPRAY BOTTLES

CONTRACT:
CONTRACT CODE:
MONTH:

DATE	AREA	CORRECT DILUTION		ACTION TO BE TAKEN (ONLY APPLICABLE IF NO)	SIGNATURE OF PERSON TESTING DILUTION RATES	SIGNATURE OF AUTHORISED MANAGER
		YES	NO			
1st						
2nd						
3rd						
4th						
5th						
6th						
7th						
8th						
9th						
10th						
11th						
12th						
13th						
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21st						
22nd						
23rd						
24th						
25th						
26th						
27th						
28th						
29th						
30th						
31st						

STANDARDS

100 ppm

No ticks or crosses allowed

No pencil allowed

No tipex allowed

All changes must be initiated

Please note:

Sanitising dilution rates – fruit & vegetables

SANITISING DILUTION RATES - FRUIT & VEGETABLES

CONTRACT: _____
 CONTRACT CODE: _____
 MONTH: _____

DATE	AREA	CORRECT DILUTION		ACTION TO BE TAKEN (ONLY APPLICABLE IF NO)	SIGNATURE OF PERSON TESTING DILUTION RATES	SIGNATURE OF AUTHORISED MANAGER
		YES	NO			
1st						
2nd						
3rd						
4th						
5th						
6th						
7th						
8th						
9th						
10th						
11th						
12th						
13th						
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25th						
26th						
27th						
28th						
29th						
30th						
31st						

STANDARDS
 1 Sachet of Sanitiser with 20l of water according to
 manufacturers instructions

Please note:

- No ticks or crosses allowed
- No pencil allowed
- No tipec allowed
- All changes must be initialed

ADDENDUM E

(FOOD & SAFETY GUIDELINES, WATER SAFETY GUIDELINES, HSCT DIET GUIDELINES)



Fred Hutchinson Cancer Research Center
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FOOD SAFETY GUIDELINES

Food borne illness is occurring with increasing frequency among the general population. A food borne illness is any illness caused by eating a food that is contaminated with a bacteria, virus, mold or parasite. Examples of organisms that can cause a food borne illness are *E. coli*, *Salmonella* and *Listeria*. Sources of food borne illness or "food poisoning" may be the food handler, the environment (such as a contaminated work surface) or the food itself.

Bacteria and other organisms exist in most common foods. Most of these organisms are of little risk to the average healthy person. However, persons undergoing chemotherapy, radiation, or a marrow or stem cell transplant are at increased risk for infections, including food borne illness. By following safe food practices, patients and caregivers can reduce the risk of food borne illness.

All persons are recommended to follow the food safety guidelines discussed below. In addition, stem cell transplant patients are recommended to follow the "*Guidelines for Immunosuppressed Patients*".

If you have any questions regarding food safety and diet guidelines, talk to your dietitian.

Steps to Food Safety

- Wash hands and surfaces often
- Avoid cross-contamination
- Keep foods at safe temperatures

Tools for Food Safety

- Food and refrigerator thermometers
- Hand soap
- Clean towels (cloth or paper)
- Bleach solution (for washing countertops, cutting boards and other items)

***Dilute Bleach Solution:** Mix 1/3 cup unscented household bleach with 3 2/3 cups water. (This will make a total of 4 cups of bleach solution.)

Personal Hygiene

- Wash hands frequently with soap and warm, running water and rubbing motion (friction) for 15 seconds before and after every step in food preparation. This is critical before and after handling raw meat, seafood and poultry.
- Wash hands before eating and after using the rest room, handling garbage, and touching pets.
- Dry hands with a paper towel or cloth hand towel that is changed daily.

Kitchen Cleanliness

- Replace dishcloths and dishtowels daily. They should be laundered in the hot cycle of your washing machine.
- Sanitize sponges daily in the dilute bleach solution* (soak for five minutes). Or you may heat them in a microwave oven on high for one minute or run them through the dishwasher.
- Use liquid dish soap and very warm water when hand-washing dishes, pans, and utensils. You may air-dry dishes instead of towel-drying them.
- Wash counters, utensils, and can openers with soap and hot water immediately after use. After washing, they can be sanitized using the dilute bleach solution.*
- Keep the refrigerator clean. Clean spills immediately. Wash shelves and doors weekly using the dilute bleach solution.*
- Make sure food storage areas remain clean.
- Rotate food stock so older items are used first. Check expiration dates. Do not use foods past the expiration dates.
- Throw away (without tasting) any bulging, leaking or cracked cans, or those deeply dented in the seam area.
- Keep appliances free of food particles (including the microwave oven, toaster, can opener, blender and mixer blades). Blender blades and the bottom ring should be removed from the blender after each use and washed in hot, soapy water.
- Do not store any food supplies under the sink. Do not store chemicals and cleaning solutions over or near food supplies.

Cutting Boards

- Plastic or glass surfaces should be used for cutting raw meat and poultry. However, wooden cutting boards are considered safe if they are used

exclusively for raw meat and poultry. Use a different board for cutting other foods such as produce and bread.

- Wash cutting boards with hot, soapy water after each use; then rinse and air-dry or pat dry with fresh paper towels. Non-porous acrylic, plastic or glass boards and solid wood boards can be washed in a dishwasher (laminated boards may crack or split).
- Sanitize both wooden and plastic cutting boards with the dilute bleach solution. * This should be done every time the board is used for raw meat, fish and poultry. Sanitize cutting boards used for other purposes at least once weekly. Flood the surface with the bleach solution and allow it to stand for at least 2 minutes, then rinse and air-dry or pat dry with fresh paper towels. Alternatively, use a commercial sanitizing agent (such as Clorox® Disinfectant Wipes) and follow the directions on the product.
- Replace worn cutting boards, including boards with cracks or grooves.

Safe Food Handling: From the Grocery Store to Your Home

Grocery Store

- Shop for shelf-stable items first (shelf-stable refers to unopened canned, bottled, or packaged food products that can be stored at room temperature before opening; the container may require refrigeration after opening.)
- Select frozen and refrigerated foods last, especially during the summer months.
- Check “Sell By” and “Use By” dates on dairy products, eggs, cereals, canned foods and other goods. Select only the freshest products.
- Check packaging dates and “use by” dates on fresh meats, poultry and seafood. Do not purchase if they are outdated.
- Do not use damaged, swollen, rusted, or deeply dented cans. Check that packaged and boxed foods are properly sealed.
- Select fruits and vegetables that are not moldy, bruised or damaged. Fresh fruits and vegetables should look fresh. Wilted salad greens may be an indication that the product is old and not properly handled.
- Avoid unpasteurized juice (unless prepared at home with washed produce)
- Choose shelf-stable salsa rather than salsas found in the refrigerator section of the grocery store.
- Avoid unpasteurized milk, yogurt, cheese, other unpasteurized milk products, including Mexican-style cheese made from unpasteurized milk (such as queso fresco).
- Do not use foods with any mold present.

- Avoid unrefrigerated, cream- and custard-filled pastry products, such as fresh bakery cream pies, Éclairs, cream-filled doughnuts and pastries. Commercial, shelf-stable items such as Danish pastries, Hostess® fruit pies, Twinkies® and Ding Dongs® are allowed. Follow the “use by” date and store them according to the manufacturer’s guidelines after opening.
- Avoid foods from “reach in” or “scoop” bulk food containers. Avoid food from any type of bulk food container if it will not be cooked prior to consumption.
- Do not taste free, unpackaged food samples.
- Choose eggs that are refrigerated in the store. Do not use cracked eggs. Pasteurized eggs, liquid pasteurized egg products (such as EggBeaters®) and powdered egg whites may be used in recipes calling for raw eggs in foods that will not be cooked.
- Place meat, poultry and fish in plastic bags. Ask to have these items placed in separate bags from the fresh produce and ready-to-eat foods when at the checkout stand.
- Never leave perishable food in the car. Refrigerate or freeze them promptly.

Home

- Wash the tops of canned foods before opening. Clean the can opener after each use.
- Throw away eggs with cracked shells.
- Throw away foods older than their “use by” expiration dates.
- Throw away entire food packages or containers with *any* mold present, including yogurt, cheese, cottage cheese, fruits (especially berries), vegetables, jelly, bread, cereal and pastry products.
- Children less than 1 year of age should never consume honey or foods made with honey.

Fruit and Vegetable Handling

All fresh produce (whether organic, natural or general produce) may carry dangerous bacteria or other organisms that can cause food borne illness. Bacterial contamination can occur in the fields from the use of natural fertilizers (such as animal manure) or from human contact during produce harvesting, transporting and in the grocery store. The term “organic” or “natural” refers to growing without the use of chemical fertilizers or pesticides, and has no relationship to the cleanliness of the produce.

Use the following guidelines for handling *all* raw produce, including organic, organically grown, “natural” and general produce:

- Refrigerate fruits and vegetables promptly.
- Do not purchase produce that has been cut at the grocery store (such as melon or cabbage halves). This is particularly true for produce that will not be cooked prior to eating.
- Rinse produce thoroughly under clean, running water just before use, including produce that is to be peeled (such as bananas, melons and oranges) or cooked. Do not wash fruits and vegetables with soaps, detergents or chlorine bleach solutions. Produce can absorb these cleaning agents.
- Commercial produce rinses (such as Fit® Fruit and Vegetable Spray) are not recommended since they have not been shown to be more effective for removing bacteria off the produce than washing under running water.
- Scrub produce that has a thick, rough skin or rind (such as cantaloupe or potatoes) or has visible dirt on the surface using a clean vegetable scrubber.
- Rinse leaves of leafy vegetables (such as lettuce, spinach, cabbage) individually under running water.
- Packaged salads, slaw mixes and other prepared produce, even when marked pre-washed, should be rinsed again under running water; a colander can be used to make this easier. Check for 'use by' dates.
 - Do not eat any raw vegetable sprouts (avoid all types, including alfalfa sprouts, clover sprouts, mung bean sprouts, and so on) due to high risk of Salmonella and E. coli contamination. Cooked mung bean sprouts are acceptable.
- Throw away fruits and vegetables that are slimy or show mold.
- Review the processing procedure if preparing home-canned foods. Be sure the procedure is appropriate for the acidity of the food, size of the bottle, and elevation above sea level. Look for mold and leaks. Check seals. *If you suspect a home-canned food may not have been properly processed (for example, if the lid bulges or if the food has any bad odor or unusual characteristics after opening), THROW IT AWAY. It is recommended to use home canned foods within one year of canning as chemical changes may occur.*

Do Not Cross-Contaminate

- Use a clean knife for cutting different foods (for example, use different knives for cutting meat, produce and bread).
- During food preparation, do not taste the food with the same utensil used for stirring. Use a clean utensil each time you taste food while preparing or cooking.
- In the refrigerator, store raw meat separately from ready-to-eat foods.
- When grilling, always use a clean plate for the cooked meat.

Keep Foods At Safe Temperatures

Proper Thermometer Use

- Insert the meat thermometer into the middle of the thickest part of the food to test for doneness. The entire part of the stem, from the dimple to the tip, must be inserted into the food. For thin foods, insert the thermometer sideways. (Also, follow the manufacturers instructions.)
- Test a thermometer's accuracy by putting it into boiling water. It should read 212°F.
- A refrigerator thermometer should be placed on a shelf toward the back of the refrigerator. It should read 40 °F or less.

Refrigeration






- Keep the refrigerator temperature between 34°F to 40°F.
- Keep the freezer temperature below 0 to 2°F.
- Never leave perishable food out of the refrigerator for over **2 hours**. Throw away food left out longer than two hours.
- Marinate foods in the refrigerator.
- Never thaw foods on the counter.
- Thaw meat, fish or poultry in the refrigerator away from raw fruits and vegetables and other prepared foods. Place on a dish to catch drips. Cook defrosted meat right away; do not refreeze. If you are in a hurry you can thaw meat in the microwave – but the meat must be cooked immediately after thawing.
- Cool hot foods uncovered in shallow containers in the refrigerator. Cover storage containers after cooling. Make sure that covers seal tightly.
- Throw away all prepared food after 72 hours (3 days). Date foods placed in the refrigerator to keep track of their age.
- Freeze foods that will not be used within 2 to 3 days.
- **NEVER TASTE FOOD THAT LOOKS OR SMELLS STRANGE!**


Cook Foods Adequately

- Cook meat until it is no longer pink and the juices run clear. These are signs that the meat may be cooked to a high enough temperature. However, the only way to be sure that the meat has been cooked to the proper temperature is to use a food thermometer (See Table 1 on the next page).
- Thoroughly heat until steaming (165°F) all hot dogs and "ready to eat" luncheon meats, cold cuts and "deli-style" meats before eating.
- Do not eat raw or lightly cooked eggs or soft boiled eggs

- Do not eat uncooked foods containing raw or undercooked eggs, such as raw cookie dough, cake batter or salad dressings containing raw or coddled eggs.
- Pasteurized eggs and liquid pasteurized egg products (such as Egg Beaters®) may be used in recipes calling for raw eggs in foods that will not be cooked.
- Hold food at safe temperatures: hot food **above** 140°F

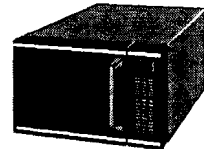
Table 1
Recommended Minimum Cooking Temperatures

Product	Cooking Temperature or Visual Characteristics
Eggs, Egg Dishes and Casseroles 	
Eggs	Cook until yolk and white are firm
Casseroles, foods containing eggs, custards and egg sauces	160°F
Veal, Beef, Pork, Lamb, Rabbit, Goat, Game 	
Whole pieces meat	160°F
Ground veal, beef, lamb, pork, rabbit, goat, game	160°F
Poultry (Chicken, Turkey, Duck, Goose) 	
Chicken and Turkey: whole bird and dark meat (leg, thigh, wing)	180°F
Breast, roast	170°F
Ground chicken, turkey	165°F
Stuffing (always cook in separate container outside of bird)	165°F
Ham 	
Fresh (raw)	160°F
Pre-cooked (to reheat)	160°F
Seafood 	
Fin fish (such as salmon, cod, halibut, snapper, sole, bass, trout)	Cook until opaque and flakes easily with a fork
Shrimp, lobster, crayfish, crab	Should turn red and flesh should

Product	Cooking Temperature or Visual Characteristics
	become pearly opaque
Scallops	Should turn milk white or opaque and firm
Clams, mussels, oysters	Cook until shells open (<i>may be high risk food for people with low white count or immunosuppressed</i>)
Leftovers, Hot Dogs and Luncheon Meats 	
Leftovers	165°F
Hot dogs, luncheon meat	Steaming hot

Microwave Cooking

- Microwave cooking can leave cold spots in food where bacteria can survive. Rotate the dish a quarter turn once or twice during cooking if there is no turntable in the appliance.
- When heating leftovers, use a lid or vented plastic wrap to cover them. Stir several times during reheating. When the food is heated thoroughly (to a minimum of 165°F), cover and let sit for 2 minutes before serving.



Additional Guidelines for General Oncology Patients with Low White Blood Count* and All Stem Cell Transplant Patients

* Low white blood cell count refers to a neutrophil count less than 1000 or when chemotherapy is held due to low neutrophil count

Dining Out Safely

- Eat early to avoid crowds.
- Ask that food be prepared fresh in fast food establishments (for example, a hamburger should be fresh off the grill, not one that has been sitting under heat lamps).
- Ask if fruit juices are pasteurized.
- **Avoid raw fruits and vegetables when dining out.** Eat these items when prepared at home, where you can wash them thoroughly and prepare them safely.
- Ask for single-serving condiment packages. Do not use public self-serve condiment containers, including salsa.
- Avoid salad bars, delicatessens, buffets and smorgasbords, potlucks and sidewalk vendors.

- Be sure that utensils are set on a napkin or clean tablecloth or placement, rather than directly on the table.
- Check the general condition of the restaurant. Are the plates, glasses, and utensils clean? Are the restrooms clean and stocked with soap and paper towels? How clean the restaurant looks may tell the amount of care taken while preparing the food.
- If you want to keep your leftovers, ask the server to bring you a box into which you can transfer the food yourself, rather than having your food transferred into a box in the restaurant kitchen. Be sure to take home and refrigerate the leftovers immediately.

General Oncology Patients

- Do not eat soft cheeses such as feta, Brie, Camembert, blue-veined, Stilton or Mexican-style cheese (queso fresco).
- Cut tofu into 1-inch cubes or smaller and boil 5 minutes in water or broth before eating or using in recipes. (Note: This process is not needed if using pasteurized tofu or aseptically packaged, shelf-stable tofu such as Mori-Nu® silken tofu.)
- Avoid fresh fruit or vegetable salsas and salad dressing found in the refrigerated section of the grocery store. Choose shelf-stable salsas and salad dressing instead (shelf-stable refers to unopened canned, bottled, or packaged food products that can be stored at room temperature before opening; the contain may require refrigeration after opening.)
- Do not consume raw honey or honeycomb. Choose grade A honey.

WATER SAFETY GUIDELINES

Public water quality and treatment varies throughout the United States, so always check with the local health department and water utility regarding the safety of household and community tap water and ice for use by immunosuppressed persons.

TAP WATER

Water from your home faucet is considered safe if your water is from a city water supply or a municipal well serving highly populated areas.

WELL WATER

Well water from private or small community wells is not considered safe for consumption by persons considered immunosuppressed and at risk for infection unless it is tested daily and found to be negative for coliforms and *Cryptosporidium* organisms.

Examples of ways well water could become contaminated:

- construction occurs near the well
- well depth is shallow
- well is located near a dairy or large numbers of livestock
- flooding has recently occurred in the well area

Municipal wells: Drinking well water from municipal wells serving highly populated areas is considered safe because the water is tested for bacterial contamination more than two times each day.

Private wells and small community wells: The quality of well water from these sources cannot be guaranteed unless it is tested daily and found to be negative for coliforms and *Cryptosporidium* organisms.

It is recommended that other approved water sources be used instead, including: boiled water or bottled water (see guidelines below).

Not considered safe: Common home water filtration devices *do not* remove bacteria or viruses. If the well water supply is chlorinated per guidelines provided by your local health department, the chlorinated water treated with one or more of the following is considered safe to consume:

- Reverse osmosis treated
- Distillation
- Filtered through an absolute 1 micron or smaller filter (NSF Standard #53 for cyst removal)

See "Water Filters" (below).

SAFE WATER SOURCES

The following sources of water are suggested if your water is not from a city water or municipal well supply:

• Boiled Water

At home, safe water can be made by bringing tap water to a rolling boil for one minute. After processing, the water should be stored in a clean, covered container in the refrigerator; discard water not used within 72 hours (3 days).

• Distilled Water

Water may be distilled using a steam distillation system. After processing, the water should be stored in a clean, covered container in the refrigerator; discard water not used within 72 hours (3 days).

• Bottled Water

Acceptable forms of bottled water have been processed to remove organisms known to cause stomach or intestinal infection. Bottled water labels reading "well water", "artesian well water", "spring water", or "mineral water" *do not guarantee* that the water is safe to drink. Water labeled as having been treated with one or more of the following are considered safe:

- Reverse osmosis treated
- Distillation
- Filtered through an absolute 1 micron or smaller filter (NSF Standard #53 for cyst removal)

To be sure that a specific bottled water has undergone one of the above processes, contact the International Bottled Water Association (IBWA) at 1-800-928-3711, or visit their home page at www.bottledwater.org. If the IBWA does not have information on a specific brand, call the bottling company directly.

Members of the International Bottled Water Association (IBWA) follow more strict manufacturing practices in their water bottling process than those practices currently mandated by the United States Food and Drug Administration. Therefore, water bottled by a member of the International Bottled Water Association may be preferable to water produced by non-member bottlers.

WATER FILTERS

Most water filtration devices will not make the water safe if the water supply has not been previously chlorinated. If you choose to install water filters on household water taps purchase only filters certified by NSF International. The following specifications must also be met:

- The filters must be designed to remove coliforms and *Cryptosporidium*. Any of the following are acceptable:
 - Reverse osmosis filter
 - Absolute pore size of filter 1 micron or smaller
 - Tested and certified by NSF Standard #53 for cyst removal
- The water tap filter must be installed immediately before the water tap
- Manufacturer directions must be followed for filter maintenance and replacement

Portable water filters (such as a Brita® or Pur® system) as well as refrigerator-dispensed water and ice machine systems do not meet filtration standards. Portable water systems filter out chemical impurities, not bacteria. If a portable water system (such as a Brita® pitcher) is used in combination with a safe water supply (to improve water flavor and remove chlorine and other impurities), it is recommended to change the system's filters frequently according to manufacturer's guidelines.

For a list of approved filtration systems, call the *National Sanitation Foundation International*, at 1-800-673-8010 or visit their home page at www.NSF.org (go to the section entitled "Home Water Treatment Devices").

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WELL WATER

Well water from private or small community wells is not considered safe for consumption by persons considered immunosuppressed and at risk for infection unless it is tested daily and found to be negative for coliforms and *Cryptosporidium* organisms.

Examples of ways well water could become contaminated:

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It is recommended that other approved water sources be used instead, including: boiled water or bottled water (see guidelines below).

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- b. The water tap filter must be installed immediately before the water tap
- c. Manufacturer directions must be followed for filter maintenance and replacement

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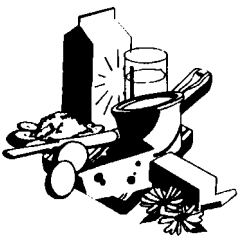




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DIET GUIDELINES FOR IMMUNOSUPPRESSED PATIENTS

Persons with decreased immune function due to chemotherapy and radiation therapy are at increased risk of developing a food-related infection. The purpose of this diet is to help you avoid specific foods that are more likely to contain infection-causing organisms while allowing maximum healthy food choices. Choose foods from the "May Eat" column. Do not eat foods in the "Do Not Eat" column. You may want to discuss the safety of these or other foods with your dietitian.




This diet should be followed before and after all conditioning (chemotherapy and/or radiation) therapy. Your doctor and dietitian will provide guidelines as to when the diet is no longer required. In general, we recommend that chemotherapy-only, autologous transplant patients follow the diet during the first three months after chemotherapy or transplant. Allogeneic transplant patients should follow the diet until off all immunosuppressive therapy such as cyclosporine, prednisone, FK-506 (Tacrolimus®) or MMF (CellCept®). Prior to the end of these time periods, patients and their caregivers should discuss with their physician whether or not the diet or parts of the diet should be continued.

Food Groups	May Eat	Do Not Eat
Dairy 	<ul style="list-style-type: none"> • All <u>pasteurized</u>, grade "A" milk and milk products • <u>Pasteurized</u> yogurt • <u>Pasteurized</u> ice cream, frozen yogurt, sherbet, ice cream bars, milkshakes • Dry, refrigerated, and frozen <u>pasteurized</u> whipped topping • <u>Pasteurized</u> eggnog • Commercially-packaged hard and semi-soft cheeses such as cheddar, mozzarella, parmesan, Swiss, Monterey Jack, etc. • <u>Pasteurized</u> processed cheese slices and spreads, 	<ul style="list-style-type: none"> • Non-pasteurized or raw milk • Yogurt made from non-pasteurized milk • Cheese made from non-pasteurized milk • Cheeses from delicatessens • Cheese containing chili peppers or other uncooked vegetables • Cheeses with molds (such as blue, Stilton, Roquefort, gorgonzola) • Soft cheeses such as brie, camembert, feta, farmer's cheese; Mexican-style soft

Food Groups	May Eat	Do Not Eat
	cream cheese, cottage cheese, ricotta cheese • Commercially sterile ready-to-feed and liquid-concentrate infant formulas (avoid powdered infant formulas if a ready-to-feed or liquid concentrate alternative is available)	cheese such as queso fresco, queso blanco
Meat and Meat Substitutes 	• All <u>well cooked or canned meats</u> (beef, pork, lamb, poultry, fish, shellfish, game, ham, bacon, sausage, hot dogs) • <u>Well cooked</u> eggs (white and yolk cooked firm) • Pasteurized eggs, pasteurized egg substitutes (such as Egg Beaters®), and powdered egg white (all can be used uncooked) • <u>Commercially-packaged</u> salami, bologna, hot dogs, ham and other luncheon meats, <u>heated until steaming</u> • Canned and shelf-stable ¹ smoked fish (refrigerate after opening) • Pasteurized tofu or cooked tofu ²	• <u>Raw or undercooked</u> meat, poultry, fish, game, tofu ¹ • <u>Raw or undercooked</u> eggs and non-pasteurized egg substitutes • Meats and cold cuts from delicatessens • Hard cured salami in natural wrap • Refrigerated smoked seafood such as salmon or trout labeled as "nova-style," "lox," "kippered," "smoked" or "jerky" unless cooked to 160°F or contained in a cooked dish or casserole • Pickled fish • Tempe (tempeh) products
Food Groups	May Eat	Do Not Eat
Fruits and Nuts 	• <u>Well washed</u> ³ raw fruit; foods containing well washed raw fruits • Canned and frozen fruit • <u>Pasteurized</u> juices and frozen juice concentrates • Dried fruits • Canned or bottled roasted nuts	• <u>Unwashed</u> raw fruits • Unroasted raw nuts • Roasted nuts in the shell • <u>Non-pasteurized</u> fruit and vegetable juices • Fresh fruit salsa found in the grocery refrigerator case • Non-pasteurized items containing raw fruits found in

¹ Shelf-stable refers to unopened canned, bottled, or packaged food products that can be stored before opening at room temperature; container may require refrigeration after opening




² Aseptically packaged, shelf-stable tofu and pasteurized tofu do not need to be boiled. Unpasteurized tofu must be cut into 1-inch cubes or smaller, and boiled a minimum of five minutes in water or broth before eating or using in recipes.

Food Groups	May Eat	Do Not Eat
	<ul style="list-style-type: none"> Nuts in baked products; shelled roasted nuts <u>Commercially-packaged</u> nut butters (such as peanut butter, almond butter, soybean butter) 	the grocery refrigerator case
Entrees, Soups 	<ul style="list-style-type: none"> All cooked entrees and soups 	<ul style="list-style-type: none"> All miso products (such as miso soup)
Vegetables 	<ul style="list-style-type: none"> <u>Well washed</u>³ raw vegetables All cooked fresh, frozen or canned vegetables, including potatoes Shelf-stable¹ bottled salsa (refrigerate after opening) Cooked vegetable sprouts (such as mung bean sprouts) Fresh, <u>well washed</u>³ herbs and dried herbs and spices (added to raw or cooked foods) 	<ul style="list-style-type: none"> <u>Unwashed</u> raw vegetables or herbs Fresh, non-pasteurized vegetable salsa found in the grocery refrigerator case Non-pasteurized items containing raw vegetables found in the grocery refrigerator case All <u>raw</u> vegetable sprouts (alfalfa sprouts, clover sprouts, mung bean sprouts, all others) Salads from delicatessens
Bread, Grain, and Cereal Products 	<ul style="list-style-type: none"> All breads, bagels, rolls, English muffins, muffins, pancakes, sweet rolls, waffles, French toast Potato chips, corn chips, tortilla chips, pretzels, popcorn Cooked pasta, rice, and other grains All cereals, cooked and ready-to-eat 	<ul style="list-style-type: none"> Raw (not baked or cooked) grain products (such as raw oats)
Beverages	<ul style="list-style-type: none"> Boiled well water⁴ Tap water and ice made from tap water⁵ 	<ul style="list-style-type: none"> Well water Cold-brewed tea made with warm or cold water

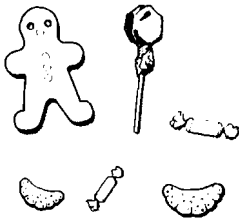
³ Rinse under clean, running water before use, including produce that is to be cooked or peeled (such as bananas, oranges and melon).

⁴ Bring tap water to a rolling boil and boil for one minute. Store boiled water in the refrigerator. Discard water not used within 72 hours (3 days).

⁵ Recommend using boiled or bottled water if using a water service other than city water service. Please see *Water Safety Guidelines* in "Food Safety Guidelines".

Food Groups	May Eat	Do Not Eat
	<ul style="list-style-type: none"> • <u>Commercially-bottled</u> distilled, spring, and natural waters⁶ • All canned, bottled, powdered beverages • Instant and brewed coffee, tea; cold brewed tea made with boiling water • Brewed herbal teas using commercially-packaged tea bags • Commercial nutritional supplements, liquid and powdered • Commercially sterile ready-to-feed and liquid-concentrate infant formulas (avoid powdered infant formulas if a ready-to-feed or liquid concentrate alternative is available) 	<ul style="list-style-type: none"> • <u>Non-pasteurized</u> fruit and vegetable juices • Mate⁷ tea • Wine, unpasteurized beer (Note: All alcoholic beverages including pasteurized beer should only be consumed following physician approval.)
Desserts 	<ul style="list-style-type: none"> • Refrigerated commercial and homemade cakes, pies, pastries, and pudding • Refrigerated, cream-filled pastries • Homemade and commercial cookies • Shelf-stable³ cream-filled cupcakes (such as Twinkies[®], Ding Dongs[®]), fruit pies (such as Poptarts[®], Hostess[®] fruit pies), and canned pudding • Ices, popsicle-like products 	<ul style="list-style-type: none"> • <u>Unrefrigerated, cream-filled</u> pastry³ products (not shelf-stable)
Food Groups	May Eat	Do Not Eat
Fats 	<ul style="list-style-type: none"> • Oil, shortening • Refrigerated lard, margarine, butter • Commercial, shelf-stable³ mayonnaise and salad dressings including Blue Cheese and other cheese-based salad dressings (refrigerate after opening) 	<ul style="list-style-type: none"> • Fresh salad dressings (stored in the grocer's refrigerated case) containing raw eggs or cheeses listed as "Do Not Eat" under "Dairy".

⁶ See *Water Safety Guidelines* in "Food Safety Guidelines" for approved bottled water treatments.

Food Groups	May Eat	Do Not Eat
	<ul style="list-style-type: none"> • Cooked gravy and sauces 	
Other 	<ul style="list-style-type: none"> • Boiled well water⁴ • Commercial Grade A honey⁷ • Salt, granulated sugar, brown sugar • Jam, jelly, syrups (refrigerate after opening) • Catsup, mustard, BBQ sauce, soy sauce, other condiments (refrigerate after opening) • Pickles, pickle relish, olives (refrigerate after opening) • Vinegar • Candy, gum 	<ul style="list-style-type: none"> • Well water • Raw honey; honey in the comb • Herbal and nutrient supplement preparations (refer to <u>Guidelines for Use of Herbal and Nutrient Supplements</u> in Patient & Caregiver Resource Manual) • Brewers yeast, if uncooked

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⁷ Honey products are not allowed for any child less than one year of age and not allowed for children with SCIDS until 9 months posttransplant.