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### Food safety in feeding services: A requirement in Brazil

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Food safety in feeding services: A requirement in Brazil

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#### Abstract

Access to food that is adequate in both quantity and quality is directly related to the health of a population. Unsafe food may cause an individual to experience varying degrees of illnesses known as foodborne disease. As their daily lives change, an increasing number of Brazilian people eat outside of their houses in restaurants, cafes, bakeries and other dining establishments. Until August 2004, food services in Brazil followed the same standards recommended for other industries; these standards were determined by the Ministry of Health through Decree 326 in 1997 and completed in 2002 by the Brazilian Health Surveillance Agency through Resolution 275. On September 15, 2004, the Brazilian Health Surveillance Agency published RDC 216 that provided information about Technical Regulation of Good Practices specifically for food services. This legislation ensures safe production of the food at Brazilian food service sites through good practices and procedures. The purpose of this review is to describe the aspects related to safe food production and to discuss the main legislation for food services in Brazil.

**Keywords:** good manipulation practices, foodborne diseases, food handling, collective feeding, food hygiene, health surveillance.

## 1 INTRODUCTION

The health of an individual depends on many factors, including some factors related to eating habits and others to the sanitary quality of the ingested food. The health-disease relationship is directly proportional to the diet balance and to the sanitary-hygienic control of the food (Silva Jr., 2008).

Despite the technological evolution of the last decades regarding food storage and hygiene, foodborne disease remains a serious public health concern worldwide. Research has proven that the efforts for control traditionally used have not solved this problem. Foodborne disease has several consequences for both the food services involved and for the individual affected by the disease.

Considering the necessity for constant improvements in food sanitation, the harmonization of sanitary inspection in food services and the development of hygienic-sanitary general requirements for food services applicable nationwide, the Brazilian Health Surveillance Agency (acronym in Portuguese: Anvisa) published RDC 216 on September 15th, 2004. This document, intended to protect the health of the population, contained the Technical Regulation for Good Practices for Food Services and gave the food service locations until March 15th, 2005, to comply with the requirements (Brasil, 2004).

In the food area, the Brazilian Health Surveillance Agency coordinates, supervises and controls the activities of registration, information, inspection, risk management and the development of regulations and standards. The objective is to ensure sanitary actions for food, drinks, bottled water, inputs, packaging, food additives and technology, along with restrictions of

the contaminants and residues of veterinary drugs. This role is shared with other ministries, such as the Ministry of Agriculture, Livestock and Supply (acronym in Portuguese: MAPA), and with states and cities that compose the National Sanitary Surveillance System (acronym in Portuguese: SNVS).

In the Brazilian legislation, the term “Good Manufacturing Practices” is used for the food industry; for the department of feeding services, RDC 216 indicates the use of the term “Good Practices” (Brasil, 2004). This naming is complemented with the further characterization of the term depending on the department that is involved; for example, the term “Good Handling Practices” (GHP) is used for restaurants, “Good Agricultural Practices” (GAP) is used for areas of primary production, “Good Distribution Practices” (GDP) is used for supermarkets, and “Good Transportation Practices (GTP) is used for the transportation industry.

According to Nascimento and Barbosa (2007), there is great concern about food safety with regards to the health of the population, and there is a good published and legal foundation for the theoretical application of Good Practices. However, research has shown a low level of application of the Good Practices in food services in Brazil, as businesses have found these processes to be difficult (Akutsu et al., 2005; Baltazar et al., 2006; Rodrigues and Salay, 2012; Saccol et al., 2009; Valente and Passos, 2004).

The purpose of this review is to describe the aspects related to safe food production and to discuss the most important health legislation for food services in Brazil.

## 2 DEVELOPMENT

## 2.1 Food Safety and Food Security

The expression “food safety” refers to safe food, whereas “food security” describes the access to food, the quality of food and food education in general. In other words, food safety exists as one part referring to the sanitary-hygienic control of food, an issue that is much discussed and widespread (Marongwe et al, 2011; Silva Jr., 2008).

According to the International Organization for Standardization (ISO) as written in the standard ISO 22000:2006 created by the Brazilian National Standards Organization (acronym in Portuguese: ABNT), food safety is described as the indication that the food will not cause harm to the consumer if it is prepared and/or consumed as intended. This definition was adapted from the Codex Alimentarius (Food and Agriculture Organization and World Health Organization, 2001). According to this definition, food safety is related to the occurrence of hazards and does not include other aspects of human health, such as malnutrition (Associação Brasileira de Normas Técnicas, 2008).

Brazil has had a great success with the Safety Food Program (acronym in Portuguese: PAS), which allows for the development of methodologies and content and for the education and training of technical professionals. These individuals spread, install and certify control tools used in food safety, like the Good Practices, the Hazard Analysis and Critical Control Point (HACCP) system and the standard ISO 22.000. The PAS was developed in 1998 with the implementation of the Good Practices and the Hazard Analysis and Critical Control Point in the food industry of Brazil. In recent years, the program has been extended to the entire supply chain, from the primary production up to the customer, including the department of feeding services called PAS MESA (Senai, 2009).

## 2.2 Food Services

In food service, food is handled, prepared, stored and/or displayed for sale, and food may or may not be consumed on site (Silva Jr., 2008; Nascimento and Barbosa, 2007). According to research from the Brazilian Institute of Geography and Statistics (acronym: IBGE), the number of Brazilians spending money on food away from their homes is increasing. Between 2002-2003 and 2008-2009, there was a significant expansion in the percentage of the average monthly spending on food away from the home in Brazil. A survey on the family budget conducted during 2002-2003 found that 24.1% of money was spent on food away from home, while the 2008-2009 survey reported 31.1% of the family budget was spent on this (Brasil, 2010). Oliveira et al. (2012) noted the importance of feeding services due to the growing number of people eating their meals away from their homes daily.

The size and importance of the food service department in the national economy can be measured by checking the registered numbers in the segment in 2011. The collective food market, as a whole, provides 10.5 million meals per day, spends 6.94 billion dollars per year and provides 190.000 direct jobs; furthermore, these numbers are growing according to the Brazilian Association of Collective Meals (Associação Brasileira de Alimentação Coletivas, 2011).

According to Jones and Angulo (2006) as well as Gurudasi and Sheth (2009), the food prepared at these feeding services is an important source of contamination implicated in the development of foodborne diseases. Research has shown a significant relationship between food and health, as well as the relevance of developing programs focused on protecting the population

from the risks inherent to the consumption of contaminated food, including what happens in food services (Tancredi et al., 2005).

### 2.3 Foodborne diseases

Food-related disorders, in general, are classified as nutritional diseases, diseases for specific food sensitivities, sensory-emotional disorders, symbolic disorders and foodborne diseases. There are over 250 types of foodborne diseases, and in 1989, the World Health Organization reported that more than 60% of food-related disorders are foodborne diseases (Silva Jr., 2008; Agência Nacional de Vigilância Sanitária, 2009; Brasil, 2005).

Foodborne diseases are defined as the consumption of food or water contaminated by microorganisms (Buzby and Roberts, 2009). According to the Ministry of Health, foodborne diseases are attributed to the ingestion of food or water contaminated by bacteria, viruses, parasites, toxins, prions, pesticides, chemicals or heavy metals (Greig and Lee, 2009; Brasil, 2005).

In Brazil, most of the foodborne diseases are caused by *Salmonella*, pathogenic *Escherichia coli* and *Clostridium perfringens*, and the toxins *Staphylococcus aureus* and *Bacillus cereus*. The symptoms depend on the etiologic agent, and the most common symptoms are loss of appetite, nausea, vomiting, diarrhea, abdominal pain and fever. Extraintestinal diseases can occur in different organs and systems, such as the liver (hepatitis A) and peripheral nerve endings (botulism) (Agência Nacional de Vigilância Sanitária, 2009).

In Rio Grande do Sul (a State of Brazil), 3.200 outbreaks were reported between 1998 and 2006, and most of these were caused by bacteria such as *Salmonella*, *Staphylococcus* (*S.*)

*aureus* or a thermotolerant coliform (Rio Grande do Sul, 2008). According to Oliveira et al. (2006), in the period between 2001 and 2002, 30% of the outbreaks that occurred in Rio Grande do Sul involved egg-based preparations.

Foodborne diseases can lead to outbreaks, defined as episodes in which two or more people have similar illnesses after eating food (including water) from the same source and where there is laboratory or epidemiological evidence that links the food or water to the disease (Brasil, 2005).

From 1999 to 2008, 6.062 outbreaks of foodborne disease were reported in Brazil, involving 117.330 people who became ill and 64 who died. Under the notification system, parts of this information were ignored, the etiologic agent was unknown in 51% of the outbreaks, the food was not identified in 34.3% of the outbreaks, and the place of occurrence was not determined in 24.1% of the notifications. The current state of the system for the epidemiological surveillance of foodborne disease in Brazil, including data published from 1999 to 2008, demonstrates that the system is not implemented in all the federal states and that there are discrepancies in the number of recorded outbreaks among regions and states (Brasil, 2008).

Some states in Brazil have surveillance services that organize the epidemiological data on foodborne diseases. The low number of inspectors, economic difficulties and weak systems for the notification of intoxication contribute to the inadequate organization of these data (Costalunga and Tondo, 2002). Outbreaks were primarily reported in the South and Southeast regions of Brazil (Rio Grande do Sul and São Paulo), and the number of cases reported is directly related to the degree of implementation of the notification system in the cities (Brasil, 2008). According to Peresi et al. (2004), the Public Health Laboratories are very important in



relation to foodborne disease; however, cases are underreported both in developed and developing countries, thereby weakening the epidemiological studies.

The onset of an illness associated with the consumption of food from a food service is closely related to sanitary conditions, in particular, to a low level of knowledge about Good Practices (Souza and Silva, 2004). Rodrigues and Salay (2012) have found that some places do not provide evidence of control practices for food safety. Even with all of the available technical resources, outbreaks have increased in countries where the culture of the people is poor, business investment is minimal, and the supervisory powers of the Sanitary Surveillance are restricted (Silva Jr., 2008).

The consumer has insufficient knowledge related to food safety, and the implementation of educational programs for consumers and handlers is an important strategy to reduce the occurrence of foodborne diseases (Genta et al., 2009; Uggioni and Salay, 2012). It is noteworthy that health surveillance services are triggered after complaints are made by consumers or when the services participating in specific programs are focused on prevention and the correction of faults that allow for the determination of outbreaks in food services before they occur (Faustino et al., 2007).

## 2.4 Good Practices for Food Services

According to RDC 216, it is necessary to adopt procedures of Good Practices in the feeding services to ensure the hygienic and sanitary quality of the food in agreement with sanitary legislation. This resolution describes the items that compose the Good Practices in food services, including the buildings, facilities, equipment, furniture and utensils, hygiene facilities,

integrated control of vectors and urban pests, water supply, waste management, handlers, raw materials, ingredients and packaging, food preparation, storage and transportation of prepared food, exposure to the consumption of prepared food, documentation and records of accountability (Brasil, 2004).

Good Practices should be implemented in the routine operation of food services and should not exist in only theoretical documents, standards and control spreadsheets (Veirois et al., 2009). Lima and Oliveira (2005) found that a significant percentage of restaurants assessed did not provide safe food with regards to hygiene and sanitation. The lack of knowledge about the obligation to implement the Good Practices by those responsible for food services is unjustified due to the wide availability of access to information and to the amount of legislation relating to this program nationwide (Erhardt and Mallmann, 2009). There is a clear need for intensified inspections and greater incentives for prevention programs, including the distribution of educational materials.

Food services must be provided with the Manual of Good Practices and the Standard Operating Procedures (SOPs), and these documents must be accessible to employees and available to the health authorities when required (Brasil, 2004). The Good Practices program generates many benefits, including food production with improved quality and safety, a decrease in complaints from the consumers and improvements in the work environment to create cleaner and safer places for employees to do their tasks with greater motivation and productivity (Silva Jr., 2008).

In most food service establishments, there are many factors that limit the implementation of Good Practices, such as a lack of awareness and training for handlers, a lack of investment in facilities and equipment and the unavailability of financial resources (Saccol, 2007). According

to Rodriguez et al. (2011), good practices should be followed and food handlers should be trained; they emphasize that continuous training of handlers should occur and constant supervision must be conducted (Park et al., 2010).

## 2.5 Brazilian Health Surveillance Agency (Anvisa)

With the creation of the Unified Health System (acronym, SUS) in 1990, the Ministry of Health had taken the first steps to decentralize the health surveillance measures, which meant decisive innovation in the traditional institutionalism of this area and a great challenge for managers at all three levels of the federation (Cohen, 2009). In 1999, the first regulatory agency in the area of social policies, Anvisa, was created in Brazil to modernize and adjust the quality of products under its control to meet national and international demands (Piovesan and Labra, 2007).

The actions of the Brazilian Health Surveillance Agency aim to eliminate or prevent risks to health and to intervene in health problems that result from the environment, production or circulation of health-related goods and services. It covers the control of consumption goods that are directly or indirectly related to health in all stages and processes, from production to consumption (Brasil, 1990; Freitas, 2007).

The Brazilian Health Surveillance Agency, due to the nature of public goods and high externality of its actions, requires federal coordination for increased regional and local cooperation as well as for the creation of structural heterogeneity in Brazilian cities (De Seta and Dain, 2010). The Brazilian Health Surveillance Agency is expected to be organized and operating in various stages of the production chain, as its mission is to protect and promote

health, to ensure the health safety of products and services and to punish the companies that endanger public health (Robbs et al., 2002; Souza and Costa, 2010).

According to Freitas (2007), the surveillance program exercises the power of authority called police power. To exercise this power, the program uses the laws and regulations (decrees, resolutions, and administrative rules) that set the parameters for the performance of production activities and services and the penalties set forth in these rules for each monitored situation. The main legal path that promotes consumer health is the food laws that are used to regulate the production, handling and marketing of foods (Valejo et al., 2003). The regulations contain mandatory rules, such as administrative rules, resolutions and other legal documents, that the agencies require companies to adopt, such as sanitary surveillance and MAPA (Oliveira and Raszl, 2009).

The Federal Constitution of 1988 states that health is a social right, and the SUS is the program that enforces this right (Brasil, 1988). The Organic Law of Health states that sanitary surveillance, as a component of the SUS, should have a prevention character (Brasil, 1990). Thus, the Brazilian Health Surveillance Agency, defined by Law number 9782 dated on January 26th, 1999, serves as a tool to assist the SUS in accomplishing its goal of health prevention and promotion (Brasil, 1999).

The surveillance agencies, both state and municipal, are responsible for the implementation of Sanitary Inspection. The professionals of these agencies must attend training, seek appropriate enforcement policies, determine local priorities, develop policies and criteria, disclose surveillance actions and monitor and inspect, when appropriate. Monitoring procedures or inspections can occur according to the situation found in the establishment, including notifications, assessments or penalties (fines or bans) (Silva Jr., 2008). According to Ribeiro and

Matté (2010), there is concern not only for the quality of the final product but also for the whole production process, as the health surveillance includes a comprehensive approach.

## 2.6 Legislation Background

Historically, ensuring that food is fit for human consumption seems to be related to religious and/or cultural precepts, even in remote locations. For centuries, governments have been taking care of the hygienic sanitary quality of food products and penalizing those who traded adulterated or deteriorated food that did not agree with the specifications stated (Germano, 2003).

In 1969, the Ministério da Marinha, Exército and Força Aérea Militar set basic standards for food through the Decree-Law number 986 (Brasil, 1969). However, it was in the 1990s that sanitary issues were framed in the official technical reference of the Codex Alimentarius through the Administrative Rule number 1428 created by the Ministry of Health. This ordinance sets the principles of Good Manufacturing Practices and Services in the food sector, the System Hazard Analysis and Critical Control Points (HACCP) program and also establishes the requirements of technical responsibility (Brasil, 1993).

In the 1990s, the most important changes in legislations occurred along with increasing awareness among entrepreneurs and increased training of technicians and food handlers (Silva Jr., 2008). During this decade, important administrative rules were prepared by the Ministry of Health, such as rule number 1428 and rule number 326. State and local administrative rules were also created, including rule number 6 in 1999, which is one of the most important administrative rules of the Center for Health Surveillance of the State of Brazil, São Paulo; the conducts and

criteria set forth in this rule have been a guidance mechanism and model for other segments of food control (Brasil, 1993; Brasil, 1997; São Paulo, 1999).

The Center of Health Surveillance (acronym in Portuguese: CVS) in São Paulo became a pioneer in the regulation of food service with the publication of the Ordinance Center for Health Surveillance rule number 6 on March 10th, 1999. This law provides technical regulation and sets the parameters and criteria for the sanitary-hygiene control in food establishments; it was amended in 2008 by the Center for Health Surveillance rule number 18 (São Paulo, 1999; São Paulo, 2008).

Before the publication of the legislation of São Paulo, the Health Surveillance Secretariat of the Ministry of Health defined Administrative Rule number 326, dated July 30th, 1997; this rule contained general requirements for the hygiene, sanitation and Good Manufacturing Practices (GMP) for the food manufacturers and industries. In a complementary manner, on October 21st, 2002, Resolution number 75 was published, introducing the continuous control of GMP and Standard Operating Procedures in addition to promoting the harmonization of sanitary inspection actions through a generic check list for food manufacturers and industries (Brasil, 2002; Brasil, 1997).

On September 15th, 2004, the Brazilian Health Surveillance Agency published the approval of the Technical Regulation of Good Practices for Food Services through RDC 216. Food establishments had a 180-day period from the date of publication to conform to the Technical Regulations. Article 2 notes that this Resolution may be supplemented by the state, district and municipal health authorities of Brazil to meet the local requirements (Brasil, 2004).

In addition to the manual of good practices, RDC 216 requires the implementation of the following four standard operational procedures (acronym: POPs): sanitation of the facilities,

equipments and furniture; control of urban vectors and pests; sanitation of the water tank; and hygiene and health of the food handlers (Brasil, 2004).

In Rio Grande do Sul, a supplementary legislation to RDC 216 developed by the Brazilian Health Surveillance Agency was published in 2006 named Administrative Rule number 542, which was repealed by Administrative Rule number 78 on January 30th, 2009. This Administrative Rule approved the Checklist for Good Practices in Food Services and the regulation of both training courses and procedures for food handlers (Brasil, 2004; Rio Grande do Sul, 2009; Rio Grande do Sul, 2006).

The Administrative Rule number 78 of Rio Grande do Sul has some additional definitions to those published in the federal legislation, and it specifies the scope of application to include service providers for events, mini-markets, supermarkets, street vendors, merchants and the kitchens of elderly and teaching institutions. This law specifies the procedures for using and cleaning cloths and sponges, rules for the use of eggs, storage specifications and procedures for cleaning fruits and vegetables, among others (Rio Grande do Sul, 2009).

## 2.7 Additional Normative Laws

According to Oliveira and Raszl (2009), the standards are developed and used voluntarily and can become mandatory through a general law or exclusive reference in a regulation.

The Codex Alimentarius Commission (CAC) publishes guides for legal agencies regarding requirements for safe food production in Brazil. Through the CAC/RCP 1, dated 1969 and updated in 2003, the CAC set the general principles of the food hygiene code to include requirements for primary production, design and construction of the facilities, control of operations, facilities specifications, maintenance and sanitation, personal care, transportation, product information, consumer awareness and employee training. The Annex of this standard

provides guidelines for implementing the HACCP System (Food Agriculture Organization and World Health Organization, 2003).

Another food service standard published by the CAC is CAC/RCP 39, created in 1993. This Code addresses the hygiene requirements for cooking raw food and handling cooked and pre-cooked food for feeding large groups of people (Food Agriculture Organization and World Health Organization, 2003).

In 2006, the Brazilian National Standards Organization (acronym: ABNT) published the standard ISO 22000:2006 that describes a management system for food safety and includes the requirements for any organization in the food chain. This rule applies to the animal feed producers, primary producers, producers of food for human consumption, transport and storage operators, distributors, retailers and food service providers. Service providers and inter-related organizations, such as producers of equipment, packaging materials, cleaning agents, additives and ingredients, are also included (ABNT, 2006).

The standard ISO 22000:2006 specifies the requirements for the management of food safety that combines these recognized key elements to ensure safety along the chain up to final consumption: interactive communication, a management system, a prerequisites program and inclusion of the principles of the HACCP System (ABNT, 2006). The HACCP system has been considered an important tool to promote the safety of the food that is produced in the industries or feeding services in Brazil, and this implementation has been recommended by different agencies worldwide. Based on these recommendations, the HACCP system has become one of the most required tools nationally and internationally (Tondo and Bartz, 2011).

In the food sector, the goal is to enhance the skills necessary to ensure both food safety and consumer satisfaction, while always emphasizing the improvement of the final products and



services being provided. In this context, the ABNT published the NBR normative rule 15635:2008, which can be used by institutions that wish to ensure and demonstrate that the good practices and essential operational controls have been implemented and to obtain certification for their establishments (ABNT, 2008).

The scope of execution of the ABNT NBR 15635 is synchronized with RDC rule number 216 of the Anvisa, which is applied to all establishments that handle, prepare, fractionate, store, distribute, transport, display food for sale or deliver food. These establishments, regardless of their size and as long as they are not regulated by a specific legislation, include restaurants, buffets, coffee shops, bake houses, pastry shops, bars, restaurants, commissaries, bakeries, delicatessens, industrial kitchens, institutional kitchens, hospital kitchens, school kitchens and similar operations (Brasil, 2004; Giordano, 2009; ABNT, 2008).

It is important to note that NBR 15635:2008 recommends that the place needs to implement the following five essential operational controls: the sanitation of fruits, vegetables and greens; cooking (thermal treatment) controls; cooling controls; maintenance/distribution (hot and cool) (Associação Brasileira de Normas Técnicas, 2008).

### 3 FINAL CONSIDERATIONS

In summary, Brazil has a good legal foundation and documentation for the production of safe food through various regulations. However, it is essential for the Brazilian states to expand their own legislations to complement the Technical Regulation of Good Practice (if they have not already done so), according to the specific situation of each location.

Epidemiological data show that the Brazilian registration system has some flaws: the notifications of outbreak situations are underreported, a large amount of the information is ignored (cause, place of consumption, etiology), and the system is not implemented in all the Brazilian states.

Further reflection and research on this subject is recommended to increase the adherence to the Good Practices, which can be used as a tool to obtain the safe food that people deserve and to increase the capabilities of the agencies to monitor these activities.

## REFERENCES

Agência Nacional de Vigilância Sanitária. (2009). Vigilância organiza mobilização nacional por alimentação segura. Brasília, DF, 13 de out. 2009. Available . [Accessed October 16, 2011].

Akutsu, R. C., Botelho, R. A., Camargo, E. B., Sávio, K. E. O., and Araújo, W. C. (2005). Adequação das boas práticas de fabricação em serviços de alimentação. *Rev. Nutr.* **18**: 419-427.

Associação Brasileira das Empresas de Refeições Coletivas. (2011). História e Mercado. Available . [Accessed April 16, 2012].

Associação Brasileira de Normas Técnicas. (2006). ABNT NBR ISO 22000. Sistema de gestão da segurança de alimentos: requisitos para qualquer organização na cadeia produtiva de alimentos. Rio de Janeiro. 35 p.

Associação Brasileira de Normas Técnicas. (2008). ABNT NBR 15.635, 27 novembro 2008. Serviços de Alimentação: Requisitos de Boas Práticas higiênico-sanitárias e controles operacionais essenciais. Rio de Janeiro. 19 p.

Baltazar, C., Shimozako, H. J., Amaku, M., Pinheiro, S. R., and Perondi, A. M. T. (2006). Avaliação higiênico-sanitária de estabelecimentos da rede *fast food* no município de São Paulo. *Hig Aliment.* **20**: 46-51.

Brasil. (1969). Senado Federal – subsecretaria de informações. Decreto lei nº. 986, de 21 de outubro de 1969. Institui normas básicas sobre alimentos. Brasília: Diário Oficial da União. 21 out. 1969. Available. [Accessed October 16, 2011].

Brasil. (1988). Senado Federal. Constituição Federal de 1988, de 05 de outubro de 1988. Dispõe da Constituição da República Federativa do Brasil de 1988. Brasília: Diário Oficial da União. 5 out. 1988. Available . [Accessed August 16, 2011].

Brasil. (1990). Congresso Nacional. Decreto Lei nº. 8080, de 19 de setembro de 1990. Dispõe sobre as condições para a promoção, proteção e recuperação da saúde, a organização e o funcionamento dos serviços correspondentes e dá outras providências. Brasília: Diário Oficial da União. 20 set. 1990. Available . [Accessed August 16, 2011].

Brasil. (1993). Ministério da Saúde. Secretaria de Vigilância Sanitária - SVS. Portaria nº. 1.428, de 26 de novembro de 1993. Dispõe sobre o regulamento técnico para inspeção sanitária de alimentos. Brasília: Diário Oficial da União. 2 dez. 1993. Available . [Accessed August 16, 2011].

Brasil. (1997). Ministério da Saúde. Secretaria de Vigilância Sanitária - SVS. Portaria nº. 326, de 30 de julho de 1997. Aprovar o Regulamento Técnico sobre as condições higiênicos-

sanitárias e de boas práticas de fabricação para estabelecimentos produtores/industrializadores de alimentos. Brasília: Diário Oficial da União. 1 ago. 1997. Available . [Accessed August 20, 2011].

Brasil. (1999). Congresso Nacional. Lei nº. 9.782, de 26 de janeiro de 1999. Define o Sistema Nacional de Vigilância Sanitária, cria a Agência Nacional de Vigilância Sanitária, e dá outras providências. Brasília: Diário Oficial da União. 11 fev. 1999. Available . [Accessed August 20, 2011].

Brasil. (2002). Ministério da Saúde. Agência Nacional da Vigilância Sanitária. Resolução RDC nº 275, de 21 de outubro de 2002. Dispõe sobre o Regulamento Técnico de Procedimentos Operacionais Padronizados aplicados aos Estabelecimentos Produtores/Industrializadores de Alimentos e a Lista de Verificação das Boas Práticas de Fabricação em Estabelecimentos Produtores/Industrializadores de Alimentos. Brasília: Diário Oficial da União. 6 nov. 2002. Available . [Accessed August 20, 2011].

Brasil. (2004). Ministério da Saúde. Agência Nacional da Vigilância Sanitária. Resolução RDC nº. 216, de 15 de setembro de 2004. Dispõe sobre o regulamento técnico de boas práticas para serviço de alimentação. Brasília: Diário Oficial da União. 16 set. 2004. Available . [Accessed August 22, 2011].

Brasil. (2005). Ministério da Saúde. Secretaria de Vigilância em Saúde. Boletim eletrônico epidemiológico: Vigilância epidemiológica das Doenças Transmitidas por Alimentos no

Brasil. Available . [Accessed April 12, 2012].

Brasil. (2008). Ministério da Saúde. Análise Epidemiológica dos Surtos de Doenças Transmitidas por Alimentos no Brasil. Available . [Accessed October 12, 2011].

Brasil. (2010). Ministério do Planejamento, Orçamento e Gestão. Instituto Brasileiro de Geografia e Estatística. Pesquisa de Orçamentos Familiares 2008-2009: Despesas, Rendimentos e Condições de Vida. IBGE, Rio de Janeiro.

Buzby, J. C., and Roberts, T. (2009). The Economics of Enteric Infections: Human Foodborne Disease Costs. *Gastroenterology*. **136**: 1851–62.

Cohen, M. M. (2009). Dilemas do processo de gestão descentralizada da vigilância sanitária no Estado do Rio de Janeiro. *Physis*. **19**: 867-901.

Costalunga, S., and Tondo, E. C. (2002). Salmonellosis in Rio Grande do Sul, Brazil, 1997 to 1999. *Braz J Microbiol*. **33**: 342-346.

De Seta, M. H., and Dain, S. (2010). Construção do Sistema Brasileiro de Vigilância Sanitária: argumentos para debate. *Ciênc. e Saúde Colet*. **15**: 3307-3317.

Erhardt, M. M., and Mallmann, C. A. (2009). Avaliação da Legislação de Boas práticas de Manipulação de Alimentos pela Vigilância Sanitária Municipal na cidade de Cachoeira do

Sul/RS. *Hig Aliment.* **23**: 178-183.

Faustino, J. S., Passos, E. C., Mello, A. R. P., Araújo, A. L. M., Souza, C. V., Jorge, L. I. F., and Zamarioli, L. A. (2007). Análises microbiológicas de alimentos processados na Baixada Santista, envolvidos em doenças transmitidas por alimentos, no período de 2000-2006. *Rev. Inst. Adolfo Lutz.* **66**: 26-30.

Food and Agriculture Organization and World Health Organization. (2001). Codex Alimentarius - Food Hygiene - Basic Texts. 2 nd. Rome: Food and Agriculture Organization of the United Nations/World Health Organization. Available . [Accessed September 16, 2011].

Food and Agriculture Organization and World Health Organization. (2003). Recommended International Code of Practice - General Principles of Food Hygiene. Codex Alimentarius Commission/RCP 1. 4nd. Rome: Food and Agriculture Organization of the United Nations / World Health Organization. Available . [Accessed September 16, 2011].

Freitas, R. M. (2007). Direito Sanitário: base legal da Vigilância Sanitária, p. 58-71. **In:** G. A. F. Werneck and M. C. Fekete (ed), Org. Textos de Vigilância Sanitária: VISA na atenção básica. Belo Horizonte, Cooperativa Editora e de Cultura Médica.

Genta, T. M. S., Mikcha, J. N. G., and Mاتيoli, G. (2009). Hygiene conditions of the self-service restaurants by evaluating the microbial quality of the mixed-food preparations. *Rev. Inst. Adolfo Lutz.* **68**: 73-82.

Germano, M. I. S. (2003). Treinamento de manipuladores de alimentos: fator de segurança alimentar e promoção da saúde, SP.

Giordano, J. C. (2009). Requisitos de melhores práticas higiênico-sanitárias e controles essenciais. *Hig Aliment*. **23**: 19-22.

Greig, J. D., and Lee, M. B. (2009). Enteric outbreaks in long –term care facilities and recommendations for prevention: a review. *Epidemiol Infect*. **137**: 145–55.

Gurudasi, R., and Sheth, M. (2009). Food safety knowledge and attitude of consumers of various foodservice establishments. *J Food Saf*. **29**: 364-380.

Jones, T. F., and Angulo, F. J. (2006). Eating in Restaurants: A Risk Factor for Foodborne Disease? *Clin Infect Dis*. **43**: 1324–8.

Lima, J. X., and Oliveira, L. F. (2005). O Crescimento do Restaurante *Self-Service*: aspectos positivos e negativos para o consumidor. *Hig Aliment*. **19**: 45-54.

Marongwe, L. S., Kwazira, K., Jenrich, M., Thierfelder, C., Kassam, A., and Friedrich, T. (2011). An African success: the case of conservation agriculture in Zimbabwe. *Int J Agric Sustainab*. **9**: 153-161.

Nascimento, G. A., and Barbosa, J. S. (2007). BPF – Boas Práticas de Fabricação: Uma Revisão. *Hig Aliment.* **21**: 24-30.

Oliveira, A. B. A. de, Ritter, A. C., Tondo, E. C., and Cardoso, M. I. (2012). Comparison of Different Washing and Disinfection Protocols Used by Food Services in Southern Brazil for Lettuce (*Lactuca sativa*). *Food Nutr Sci.* **3**: 28-33.

Oliveira, F. A., Brandelli, A., and Tondo, E. C. (2006). Antimicrobial resistance in *Salmonella Enteritidis* from foods involved in human salmonellosis outbreaks in southern Brazil. *New Microbiol.* **29**: 49-5.

Oliveira, K. H., and Raszl, S. M. (2009). Formação de Auditores Internos de Sistemas de Gestão de Qualidade e de Segurança de Alimentos, Florianópolis.

Park, S. H., Kwak, T. K., and Chang, H. J. (2010). Evaluation of the food safety training for food handlers in restaurant operations. *Nutr. Res. Pract.* **4**: 58-68.

Peresi, J. T. M., Almeida, I. A. Z. C., Teixeira, I. S. C., Lima, S. L., Carnicel, F. A., and Hoffmann, F. L. (2004). Surtos de doenças transmitidas por alimentos contaminados por *Staphylococcus aureus*, ocorridos no período de dezembro de 2001 a abril de 2003, na região de São José do Rio Preto – SP. *Rev. Inst. Adolfo Lutz.* **63**: 232-237.

Piovesan, M. F., and Labra, M. E. (2007). Institutional change and political decision-making



in the creation of the Brazilian National Health Surveillance Agency. *Cad. de Saúde Pública*. **23**: 1373-82.

Ribeiro, V. F., and Matté, G. R. (2010). Análise da produção acadêmica em vigilância sanitária de alimentos, 1993–2007. *Rev. Saúde Públ.* **44**: 1155-8.

Rio Grande do Sul. (2006). Secretaria da Saúde. Portaria nº. 542, de 17 de outubro de 2006. Aprova a Lista de Verificação em Boas Práticas para Serviços de Alimentação, aprova Normas para Cursos de Capacitação em Boas Práticas para Serviços de Alimentação e dá outras providências. Porto Alegre: Diário Oficial do Estado. 19 out. 2006. Available . [Accessed September 25, 2011].

Rio Grande do Sul. (2008). Secretaria Estadual da Saúde. Divisão de Vigilância Sanitária. Relatórios Anuais de DTA. Porto Alegre, 2008.

Rio Grande do Sul. (2009). Secretaria da Saúde. Portaria nº. 78, de 28 de janeiro de 2009. Aprova a Lista de Verificação em Boas Práticas para Serviços de Alimentação, aprova Normas para Cursos de Capacitação em Boas Práticas para Serviços de Alimentação e dá outras providências. Porto Alegre: Diário Oficial do Estado. 30 jan. 2009. Available . [Accessed September 25, 2011].

Robbs, P. G., Silva Jr, E. A., Lima Filho, J. B., and Paranaguá, M. M. M. (2002). APPCC Mesa: As boas práticas do campo à mesa. *Nutrição em Pauta*. **53**: 9-15.

Rodrigues, K. R. M., and Salay, E. (2012). Food safety control practices in in-house and outsourced foodservices and fresh vegetable suppliers. *Food Control*. **25**: 767-772.

Rodriguez, M. A., Valero, E., Carrasco, F., and Pérez-Rodríguez, G. D. (2011). Hygienic conditions and microbiological status of chilled ready-to-eat products served in Southern Spanish hospitals. *Food Control*. **22**: 874-82.

Saccol, A. L. F. (2007). Sistematização de ferramenta de apoio para boas práticas em serviços de alimentação. [dissertação de mestrado]. Santa Maria (RS): Universidade Federal de Santa Maria; 2007. Available . [Accessed September 12, 2011].

Saccol, A. L. F., Stangarlin, L., Richards, N. S., and Hecktheuer, L. H. (2009). Avaliação das Boas Práticas em duas visões: técnica e da empresa. *Braz J Food Technol*. **II SSA**: 19-23.

São Paulo. (1999). Centro de Vigilância Sanitária. Portaria CVS nº. 06, de 10 de março de 1999. Aprovar o Regulamento Técnico, que estabelece os parâmetros e critérios para o controle higiênico-sanitário em estabelecimentos de alimentos. São Paulo: Diário Oficial do Estado. 10 mar. 1999. Available . [Accessed September 04, 2011].

São Paulo. (2008). Centro de Vigilância Sanitária. Portaria CVS nº. 18, de 09 de setembro de 2008. Aprovar alteração do item 4 - Controle de Saúde dos Funcionários, do item 16 -

Higiene Ambiental e do subitem 16.3 da Portaria CVS nº 06. São Paulo: Diário Oficial do Estado. 11 set. 2008. Available . [Accessed September 04, 2011].

Senai. (2009). Guia para implantação das Boas Práticas de Fabricação (BPF) e do sistema APPCC para Técnicos. PAS Indústria. Brasília: SENAI/DN, 2009. Convênio SENAI/SEBRAE/SESI/SESC/SENAC.

Silva Jr., E. A. (2008). Manual de controle higiênico-sanitário em serviços de alimentação. 6ed. São Paulo.

Souza, E. L., and Silva, C. A. (2004). Qualidade sanitária de equipamentos, superfícies, água e mãos de manipuladores de alguns estabelecimentos que comercializam alimentos na cidade de João Pessoa, PB. *Hig Aliment.* **18**: 98-102.

Souza, G. S., and Costa, E. A. (2010). Considerações teóricas e conceituais acerca do trabalho em vigilância sanitária, campo específico do trabalho em saúde. *Ciê. Saúde Colet.* **15**: 3329-40.

Tancredi, R. C. P., Moraes, O. M. G., and Marin, V. A. (2005). Vigilância sanitária do Município do Rio de Janeiro: Considerações sobre as ações fiscais na área de alimentos. *Hig. Aliment.* **19**: 21-7.

Tondo, E. C., and Bartz, S. (2011). Microbiologia e Sistemas de Gestão da Segurança de Alimentos. Porto Alegre: Sulina.

Uggioni, P. L., and Salay, E. (2012). Consumer knowledge concerning safe handling practices to prevent microbiological contamination in commercial restaurants and socio-demographic characteristics, Campinas/SP/Brazil. *Food Control*. **26**: 331-336.

Valejo, F. A. M., Andrés, C. R., Mantovan, F. B., Rister, G. P., Santos, G. D., and Andrade, F. F. (2003). Vigilância sanitária: avaliação e controle da qualidade dos alimentos. *Hig Aliment*. **17**: 16-21.

Valente, D., and Passos, A. D. C. (2004). Avaliação higiênico-sanitária e físico estrutural dos supermercados de uma cidade do sudoeste do Brasil. *Rev Bras Epidemiol*. **7**: 80-87.

Veiros, M. B., Proença, R. P. C., Santos, M. C. T., Kent-Smith, L., and Rocha, A. (2009). Food safety practices in a Portuguese canteen. *Food Control*. **20**: 936-41.