



**Asia-Pacific
Economic Cooperation**



FSCF Food Safety
Cooperation Forum
PTIN Partnership Training
Institute Network



IMPROVING FOOD SAFETY

*through Hand Washing
and Drying Capacity Building*

Improving Food Safety through Hand Washing and Drying Capacity Building

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DEVELOPING AN EFFECTIVE HAND HYGIENE PROTOCOL

Overview

The Asia-Pacific Economic Cooperation (APEC) Food Safety Cooperation Forum Partnership Training Institute Network (FSCF PTIN) was established in 2008 to improve food safety in the Asia-Pacific region by building the capacity of APEC Economies to prevent, detect, and control foodborne pathogens. To achieve this goal, the FSCF PTIN convenes key stakeholders along every step of the global food supply chain – the food industry, academic food safety experts, and government regulators – to address critical food safety gaps. One of the most critical contamination points in food safety practices is hand hygiene. APEC has recognized that hand hygiene is a fundamental first response to ensuring food safety. According to the U.S. Centers for Disease Control and Prevention (CDC), approximately 25-50% of food workers do not wash their hands for the recommended time. Meta-analysis of 66 outbreaks that occurred in the US between 1975 and 1998 found that 82% of the outbreaks implicated food workers as the source of contamination and, in 50% of the cases, hands were the source of pathogen transmission.¹

Kimberly-Clark Professional (KCP), a global hygiene leader, conducted a FSCF PTIN project to test hand hygiene compliance in a food processing facility in an APEC Economy. The goal of the project was to determine the overall effectiveness of a hand washing and drying protocol and undertake a comparative analysis with other hand drying methods in a controlled environment to determine the type of hand hygiene system that is best suited to ensure the removal of the maximum number of bacteria. The study was developed to help guide food preparation facilities and workers on the most effective hand hygiene protocol with minimal cost and maximum uptake on site. The project consisted of two experiments: Experiment A: effect of proper hand washing and drying on residual hand bacteria in an actual food processing environment; and Experiment B: Testing compliance and efficiency of hand drying.

Experiment A

Experiment A tested hand hygiene behavior change in the food processing facility. The experiment helped food processing workers understand the importance of bacterial removal before food preparation. The project coordinators made the following pre-test observations. Food processing workers were not spending enough time washing their hands. They estimated each worker spent approximately 5-8 seconds washing as the infrastructure was not conducive to effective hand-washing and drying. Some workers by-passed long lines.

KCP hypothesized that if workers were shown the bacterial load on the skin before and after hand washing and drying their hands, workers in food processing facilities and facilities managers would better understand the importance of hand hygiene. They would then be more likely to follow effective hand hygiene protocols in the hygiene station or bathroom setting within their food processing facility.

Using the swabs collected from each worker's hands, the microbiological lab measured hand cleanliness

1. Jensen et al. "Quantifying the Effect of Hand Wash Duration, Soap Use, Ground Beef Debris and Drying Methods on the Removal of *Enterobacter aerogenes* on Hands." *J of Food Protection*, 2015.

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by the number of colony-forming units (CFUs) present after the workers washed and dried their hands. According to the CDC, below 10 CFUs is considered “very clean”; 10-1000 CFUs is considered “clean”; and over 1000 CFUs is considered “dirty”.²

Sample 1, June 16th. Sample 1 was a baseline study of the food workers’ hand hygiene behavior. KCP advised the facility that the number of sink stations was insufficient to handle their worker load, which the facility rectified by installing five new sinks for the experiment. Workers were asked to wash and dry their hands normally. The workers’ hands were then swabbed by microbiological lab personnel.

- Sample 1 found that 55% of the workers had dirty hands, 33% were acceptably clean, and only 12% were very clean.

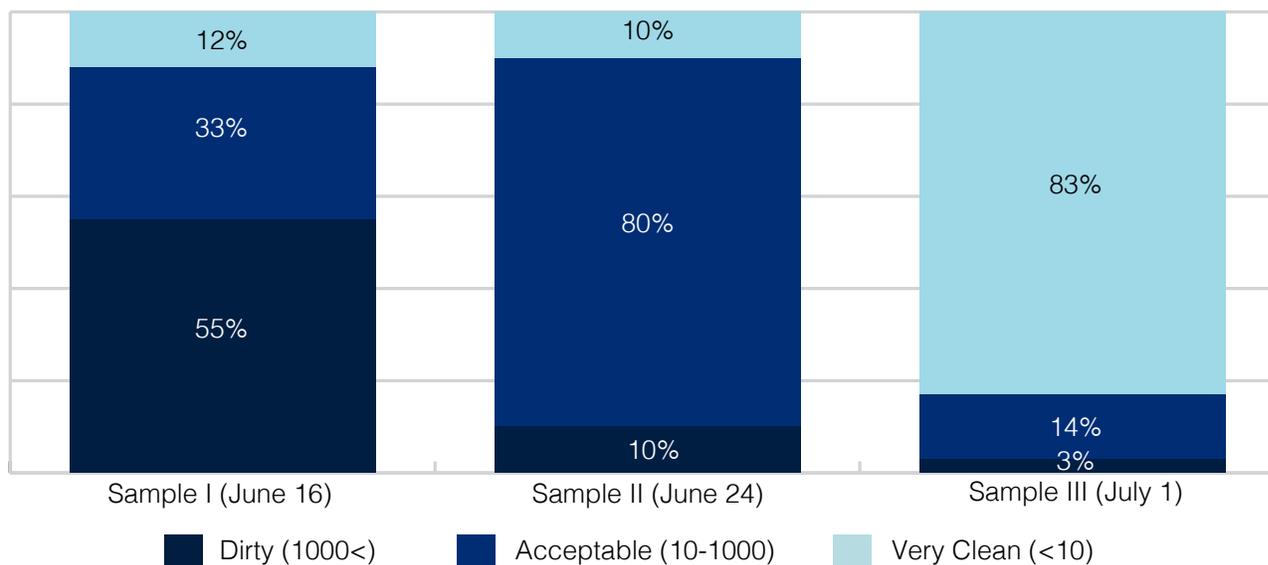
Sample 2, June 24th. Sample 2 included a behavioral science intervention. Workers and facilities managers were educated on the importance of hand hygiene and introduced to the appropriate protocol in the hygiene station. Every food worker was asked to place a stamp on another worker’s hand. Then workers were asked to wash and dry their hands. The workers’ hands were then swabbed by microbiological lab personnel.

- Sample 2 found that only 10% of workers had dirty hands after washing and drying, 80% were acceptably clean, and 10% were very clean.

Sample 3, July 1st. The week following the behavioral science intervention, workers did not receive a hand hygiene tutorial or a stamp on their hands. Workers were only asked to wash and dry their hands normally. The workers’ hands were then swabbed by microbiological lab personnel.

- Sample 3 found that the food workers’ hand hygiene behavior improved slightly from Sample 2 when the behavioral science intervention was introduced. Sample 3 found that only 3% workers still had dirty hands after washing and drying, 14% were acceptably clean, and 83% were very clean.

Graph 1: Results of Experiment A in Peru food processing facility - Samples 1-3



2. U.S. Centers for Disease Control and Prevention, Guideline for Hand Hygiene in Health-Care Settings

Experiment B

Experiment B tested compliance and efficiency of hand drying as the transmission of bacteria is more likely from wet skin than dry hands.³ Wet hands transmit bacteria, but as workers often wrongly believe that drying is secondary and not necessary to a hand hygiene protocol, facility managers need to understand ways of monitoring compliance and the most efficient and effective method of hand drying for their facility.

The food processing facility hand hygiene station was outfitted with a jet air dryer for hand drying. A shift was selected to proceed with testing of a given number, “n”, of workers, determined by appropriate statistical analysis. Upon hand washing in the bathroom, the microbiological lab personnel randomly selected workers to dry their hands with one of two methods. The first group was asked to dry their hands with a jet air dryer (according to manufacturer’s instructions) for 10 seconds. After the drying time was complete, their hands were subjected to plating or swabbing by microbiological lab personnel. And, the second group of workers was asked to dry their hands with one or two single use paper towels for 10 seconds. After the drying time was complete, their hands were subjected to plating or swabbing by microbiological lab personnel.

The experiment found that after drying for 10 seconds, there was a 2.5x greater odds of hands being considered “dirty” if the hands were dried using new jet air dryers than single use paper towels. The experiment also found that there were 3.3x greater odds of hands being considered “very clean” after drying with single use paper towels.

Conclusions

This project examined the use of behavioral science to drive change in hand hygiene habits. The positioning of both hard (sufficient hand hygiene stations) and soft (behavioral change) infrastructure are needed to assure good hygiene. The popular neoclassical economic theory approach to hand hygiene improvement can be characterized by the phrase ‘shift attitudes to change behavior’. A behavioral science approach indicates the opposite may be true; ‘change behavior and attitudes will shift accordingly’.

Proper hand hygiene is critical in preventing food safety incidents and should be an integral component of food safety system strengthening efforts. As part of global efforts to see that food safety measures are developed in a science-based manner, APEC Economies should take into account lessons from behavioral science as essential to driving an improvement in hand hygiene compliance. People can wash and dry their hands, but they must understand why they are washing and drying their hands.

The results of this project should also encourage APEC Economies to think about the concept of food safety infrastructure more broadly (not just hand hygiene, although that is the first line of defense), and in terms of the adequacy of food processing line equipment and operation. APEC Economies focus their efforts on improving systems, legislation and regulation. This project demonstrated the need for APEC Economies to also consider the biggest risk to food safety – people. As leaders in building capacity to implement international food safety standards, APEC also has to bring about cultural change within economies, or otherwise the rules and regulations are redundant.

3. Mayo Clinic Proceedings 2012, Vol 87, Issue 8, 791-796

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RECOMMENDATIONS TO THE APEC SCSC FSCF PTIN:

Building an effective food safety infrastructure in the Asia-Pacific region requires a commitment from APEC Economies and food processing facilities to promote good hand hygiene and implement improvements in the hand hygiene infrastructure and in hand hygiene interventions.

The hand hygiene infrastructure includes the facilities, equipment, training, and products required to achieve optimal hand hygiene practices within the facility as detailed in the *WHO Guidelines on Hand Hygiene in Health Care*. The hand hygiene infrastructure is not complex. According to the WHO, it requires the following: a continuous supply of clean, running water; soap; and single-use paper towels at each sink.⁴

Hand hygiene interventions include both single and multi-level interventions that include staff and/or quality assurance manager education and involvement, feedback initiatives, cultural change, organizational change, social marketing, additional sinks and alcohol dispensers, or a combination of the above. Advocates of hand hygiene improvement interventions recommend that multimodal interventions are needed to induce sustained hand hygiene practice improvements and should be based on theories of behavior change.⁵

APEC Economies, food processing companies, and key stakeholders should work together to achieve good hand hygiene compliance through the following actions:

For APEC Economies:

- APEC Economies should encourage use of appropriate toolkits and industry guidance to help improve hand hygiene compliance in food processing facilities.
- APEC Economies should promote hand hygiene at the community level to strengthen both self-protection and the protection of the consumer/customer.
- APEC Economies should encourage food processing facilities to use hand hygiene as a quality indicator.
- APEC Economies should examine international hand hygiene guidances with a view to identifying gaps.
- APEC Economies should also promote the use of the internationally-recognized self-assessment tools to obtain a situation analysis of hand hygiene promotion and practices within an individual food processing facility.

For food processing facilities

- Ensure that conditions are conducive to the promotion of a multifaceted, multimodal hand hygiene strategy and promote a hygienic environment, including the use of single-use paper towels at each sink.
- Make improved hand hygiene adherence (compliance) an institutional priority and provide appropriate leadership, administrative support, and resources.

4. WHO Hand Hygiene Self-Assessment Framework 2010 http://www.who.int/gpsc/country_work/hhsa_framework_October_2010.pdf

5. Making Health Care Safer II: An Updated Critical Analysis of the Evidence for patient Safety Practices. 2013 Agency for Healthcare Research and Quality. No. 211

- Quality assurance managers should recognize the return on investment in hand hygiene programs. Hand hygiene programs are cost-effective and result in sizeable net cost savings as compared to the costs required to recall contaminated food.⁶
- Ensure facilities are equipped with the appropriate infrastructure and provide workers with access to effective hand-drying infrastructure which results in significant reductions in bacterial count.

Next steps:

- APEC to examine international hand hygiene guidance and identify gaps and develop industry partnerships, industry guidance, and toolkits to train food processing workers on the basics of hand hygiene to help assure the safety of the food market value chain.



6. For grocery producing companies facing a recall in the past 5 years, 23% of companies estimated the impact to be \$30 million and 52% of respondents estimated the impact to be \$10 million. Grocery Manufacturers Association, 2011

HYGIENE OBSERVATION CHECKLIST

1. Hand Washing/Drying Steps

Note: Choose five workers to observe. For each, check the boxes to indicate which of the following hygiene actions are taken.

	Worker 1	Worker 2	Worker 3	Worker 4	Worker 5
Rinse Hands (Before Applying Soap)					
Apply Soap					
Rub Palms					
Interlace Fingers (Palm to Palm)					
Interlace Fingers (Palm To Back Of Hand)					
Fingers Interlock					
Rub Thumbs					
Nails/Fingertips On Palms					
Rinse Hands (Remove Soap)					
Shake Hands Before Drying					
Dry Hands with single use towels					
Dry Hands with other methods for appropriate duration					
Sanitize Hands					

2. Other Risky Practices

Note: Choose a 15 minute period at the start of 5 different shifts over the period of one week. For each session, observe workers as they are entering the production area. Take notes on which of the following behaviors/situations you observe.

	Comments
Sick Personnel On Site	
Exposed Cuts, Sores Or Lesions	
Touching Surfaces After Washing/Drying	
Employees Drying Hands On Aprons	
Employees Waiting In Line With Wet Hands	
Other(s):	

3. Sanitary Equipment Observations

Note: Over the period of one week, conduct 5 audits of the facility during different shifts. For each session, take notes on which of the following behaviors/situations you observe.

	Comments
Waste On Floor (i.e. Towels, PPE, Food, etc.)	
Overflowing Waste Bins	
Water On Surfaces and/or Floors	
Other(s):	

GAP ANALYSIS OF INTERNATIONAL FOOD HYGIENE LAW, REGULATIONS, AND STANDARDS AS THEY RELATE TO HAND HYGIENE PROTOCOLS

Executive Summary

- A significant gap exists in food safety standards and guidance internationally concerning hand hygiene
- There is currently no internationally accepted protocol or accepted best-practice model for hand-hygiene practices in the food sector
- Variance in accepted hand hygiene practices exist between international codes, economy-level codes, and private food safety schemes
- Variances between codes include structural differences (regarding facilities), procedural differences, and availability of guidance documents (food codes) paired with regulations between economies
- Facility differences and hand hygiene protocols are linked to altered behavioral practices and ultimately altered hygienic outcomes

Introduction

There is an increasing awareness of the fundamental role of good hygiene practices in ensuring food safety. However, both compliance with best practice and the efficacy of current hygiene standards are open to question. Quality assurance surveys of hand hygiene practices in food processing facilities have shown low compliance with best practices leading to increased food safety risk.

In September 2016, the APEC Ministers Responsible for Food Security called for a gap analysis of hand hygiene standards and guidance for the food sector currently in force internationally. In November 2016, the APEC Sub-Committee on Standards and Conformance (SCSC) noted in its 2016 report to the Committee on Trade and Investment at the Concluding Senior Officials Meeting that the SCSC would be looking at identifying best practices in hand hygiene and examining next steps following the gap analysis.

The following gap analysis was conducted under the Food Safety Cooperation Forum (FSCF) Partnership Training Institute Network (PTIN). The objective of the analysis was to establish a baseline understanding of global guidance (Codex Alimentarius), those promulgated by other bodies such as the World Health Organization (WHO) and the International Organization for Standardization (ISO), and determine which APEC Economies and other economies have hand hygiene standards or guidance in regulation.

A general survey was completed of publicly available food safety codes to describe and assess regulations and guidance related to hand hygiene. The research is not exhaustive; however, the sample of economy policies and standards set out in the gap analysis accurately reflects readily accessible hand hygiene protocols and identifies the similarities and differences between them. The gap analysis consists of two

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major international codes, 12 APEC Economies, 6 non-APEC contexts including the European Union, and three representative private schemes. The Annex includes an extensive elaboration of hand hygiene related language contained within many Codex Alimentarius principles and guidelines documents.

Analysis

Through analysis of existing global hand hygiene regulations and guidances for the food sector, we have identified a significant lack of guidance for acceptable hand hygiene practice. In many cases hand washing facilities (e.g. soap and water) are addressed, however other critical elements are missing, such as duration and technique of wash, hand drying (in a way that avoids pathogen dispersal) among others. There is a clear lack of an internationally recognized best practice given the variances between international, domestic, and private schemes.

International codes, particularly the Codex Alimentarius *General Principles of Food Hygiene*¹, provide a very broad overview of acceptable hand hygiene, but do not identify means necessary to achieve the goal or provide baseline acceptable practices. While breadth in language is essential for creating inclusivity in many other parts of the *General Principles*, the risk attached to leaving governments and food business operations without specific guidance outweighs the benefit of flexibility in describing beneficial hand hygiene practices.

Within domestic laws and regulations, gaps are visible regarding hand hygiene requirements for food processing facilities in addition to a general lack of availability of guidance documents to accomplish stated standards. Many APEC economies have a similar approach to mandating general hand hygiene requirements by law, but have varying or no language regarding hand hygiene protocols (i.e. hand washing time, temperature control of water, use of paper towels versus air technologies, and layout). Beyond statutory language, some APEC Economies lack a guidance document (food code). The purpose of a food code is to provide practical means for complying with the regulations codified within the law. This gap within certain APEC and other economies is a strong case for the addition of practical language to the *Codex General Principles of Food Hygiene* due to its clear visibility and understood best practice. Notably, for settings that use Codex as the sole source of food law and food safety this is critical. The reach of Codex into areas of the world with little domestic guidance may, arguably, be the best reason for expanding upon food safety details within the document.

The European Union (EU) and private schemes show variances in protocol and facility requirements and bring to light the need for food safety protocol that is easily accessible. Economies within the EU have developed individual guides for food safety in line with European Commission (EC) law but also exhibit hand hygiene differences (one example is the unique mandate in Ireland against the use of air drying within processing facilities due to potential pathogen spreading). Additionally, country standards, even those developed for public use, and industry guidelines often require payment. In the case of not using a country standard for reasons that may include the need for payment, a sole reliance on EC law will again, provide a very broad explanation to actually achieving the goal of hygienic hands.

Private standards are often detailed and typically meet the requirements of law with additional guidance. However, variances in hand hygiene protocol also exist and access to private standards and particularly

1. http://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252F-sites%252Fcodex%252FStandards%252FCAC%2BRCP%2B1-1969%252FCXP_001e.pdf

interpretation guidelines, often require payment which limits the range of their audience. Notably, in conducting this research, the gap in guidance was confirmed by certain private scheme makers who acknowledged the lack of an international best practice for hand hygiene to reference within their schemes. This gap likely explains the variations in acceptable baseline protocol and facilities for hand hygiene between private schemes despite being benchmarked by the same organization.

In conclusion, there is a significant gap in internationally recognized best practice and guidance on hand hygiene for the food sector given the variances between international, domestic, and private schemes.

Recommendations

APEC, and specifically the Food Safety Cooperation Forum (FSCF), can help address the significant gap in internationally recognized best practice and guidance on hand hygiene for the food sector. APEC, either as a group or individual economies, should consider recommending that the existing Codex Alimentarius *General Principles of Food Hygiene* either codify or reference an existing best practice model for hand hygiene. The *General Principles* is a highly visible and accessible document that serves as the single largest foundation for global food safety. Such an augmentation to the *General Principles* will help governments, firms, and operators to develop more effective guidance targeted at improving food safety; raise awareness for existing unhygienic establishments without placing an undue burden on existing operations with effective food safety controls; and, promote an overall safer global food chain from farm to fork.

Should APEC Economies decide to pursue either of these options, the *WHO Guidelines on Hand Hygiene in Health Care*², would be an appropriate model to use as a framework or best-practice reference document. Healthcare, much like the food industry, is highly dependent on hygienic hands and is similarly diverse in settings. The WHO states that the *Guidelines on Hand Hygiene in Healthcare* are “intended to be implemented in any situation in which health care is delivered either to a patient or to a specific group in a population.” Though the guidelines may need to be adapted to specific settings (i.e. primary care clinic versus operating theater) they establish a fundamental acceptable protocol that is transferrable. An identical approach of adaptability but with a uniform understanding of baseline hygienic hand protocol can be applied to the food sector.

The healthcare sector has invested heavily in the area of hand hygiene with well noted impacts including greatly reduced incidence of nosocomial infections.³ Importantly, the behavioral aspects of hand hygiene, which depend on many factors including an understanding of protocol, are accepted as one of the fundamental barriers and solutions to improved outcomes.⁴ Regarding the food sector, a similar justification can be made for providing more guidance in this area. Variations in hand hygiene behavior, exclusive of more stringent measures, are objectively not beneficial as they lead to variations in outcome. A best practice model will move the food industry in the direction of a more uniform practice and therefore more controllable behavioral component. Just as the health sector has seen drastic improvements in this area, it is not unforeseeable to further reduce or eliminate foodborne illness resulting from unhygienic hands.

2. http://apps.who.int/iris/bitstream/10665/44102/1/9789241597906_eng.pdf

3. Pittet, D., Hugonnet, S., Harbarth, S., Mourouga, P., Sauvan, V., Touveneau, S., & Perneger, T. V. (2000). Effectiveness of a hospital-wide programme to improve compliance with hand hygiene. *The Lancet*, 356(9238), 1307-1312.

4. Pittet, D. (2001). Improving adherence to hand hygiene practice: a multidisciplinary approach. *Emerging Infectious Diseases*, 7(2), 234-240.

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The WHO model *WHO Guidelines on Hand Hygiene in Health Care* is scientific in nature, extensive in justification for practice, and extremely clear in application. Additionally, given the connection between Codex and the WHO as well as the numerous references to the WHO within Codex (including certain circumstance related to hand hygiene- see annex) there is a natural pairing of the two documents. For these reasons, and for those mentioned previously, APEC Economies may see this guideline as an appropriate recommendation for inclusion to Codex, or as model for the development of new guidelines unique to Codex.

In conclusion, given the well-established risks of pathogen transmission from hands to food, the need for food safety from farm to fork, and the lack of international guidance in this area as displayed through the gap analysis, APEC should consider pursuing the integration of the *WHO Guidelines on Hand Hygiene in Health Care*, whether by reference or as a model, into the Codex Alimentarius *General Principles of Food Hygiene*.

APEC ACTION:

We welcome work on best practice models for hand hygiene in food processing facilities and the *APEC Gap Analysis of International Food Hygiene Law, Regulations, and Standards as they Relate to Hand Hygiene Protocols* (APEC Gap Analysis), which examined the variance in hand hygiene guidance between international codes, economy-level codes, and private food safety schemes, as an output of the FSCF. The FSCF also noted that there is currently no internationally accepted protocol or best-practice model for hand hygiene in the food sector and referred the APEC Gap Analysis to Codex Alimentarius as an information document.

APEC Food Safety Cooperation Forum Statement
13 May 2017, Hanoi, Viet Nam

GAP ANALYSIS

International Codes

Codex Alimentarius

The *General Principles of Food Hygiene* is the foundational document for food hygiene within Codex. Currently, a hand hygiene protocol is not detailed within the document but rather falls into the category of a prerequisite program (PRP). Prerequisite programs are established as one criteria of a Hazard Analysis of Critical Control Points (HACCP) plan but vary by operation. (Please see the annex for hand hygiene protocol language within a range of other Codex guidelines).

Prerequisite programs, and by extension a hand hygiene protocol, can be unique to individual establishments. PRPs are intended to allow for variations in process. However the risk management benefits of variations in hand hygiene protocol is controversial given the significant potential adverse effect on food safety of an insufficient program. Particularly in economies that depend solely on Codex Alimentarius for food safety guidance, the lack of a detailed hand hygiene practice within the standard, or reference to an external best practice model, creates an unnecessary and potentially dangerous gap which, if not addressed, could inhibit action to improve food safety. One example of a specific protocol which establishes best practice model for effective hand hygiene in varying contexts is the *WHO Guidelines on Hand Hygiene in Health Care*. The WHO Guidelines is an excellent example of establishing a best practice that can adjust for specific needs depending on different circumstances taking into account both risk and economic circumstance (e.g, rural healthcare worker versus surgeon).

*Codex General Principles of Food Hygiene*⁵

4.4.4 Personnel hygiene facilities and toilets

Personnel hygiene facilities should be available to ensure that an appropriate degree of personal hygiene can be maintained and to avoid contaminating food. Where appropriate, facilities should include:

- adequate means of hygienically washing and drying hands, including wash basins and a supply of hot and cold (or suitably temperature controlled) water;
- lavatories of appropriate hygienic design; and
- adequate changing facilities for personnel.

Such facilities should be suitably located and designated.

International Organization for Standardization (ISO)

The ISO 22000 family of international standards addresses food safety management and references hand hygiene as a prerequisite program for facilities.

5. http://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252F-sites%252Fcodex%252Fstandards%252FCAC%2BRCP%2B1-1969%252FCXP_001e.pdf

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ISO-22000⁶

13.2 Personnel hygiene facilities and toilets

Personnel hygiene facilities shall be available to ensure that the degree of personal hygiene required by the organization can be maintained. The facilities shall be located close to the points where hygiene requirements apply and shall be clearly designated.

Establishments shall:

a) provide adequate numbers, locations and means of hygienically washing, drying and, where required, sanitizing hands (including wash-basins, supply of hot and cold or temperature controlled water, and soap and/or sanitizer);

b) have sinks designated for hand washing, whose taps should not be hand operated, separate from sinks for food use and equipment-cleaning stations;

Codes in APEC Economies

Australia

Standard 3.2.2 Food Safety Practices and General Requirements⁷

(2) A food handler must wash his or her hands in accordance with subclause

- (a) whenever his or her hands are likely to be a source of contamination of food;
- (b) immediately before working with ready-to-eat food after handling raw food; and
- (c) immediately after using the toilet.

(4) A food handler must, whenever washing his or her hands –

- (a) use the hand washing facilities provided;
- (b) thoroughly clean his or her hands using soap or other effective means, and warm running water; and
- (c) thoroughly dry his or her hands on a single use towel or in another way that is not likely to transfer pathogenic microorganisms to the hands.

Safe Food Australia - A Guide to the Food Safety Standards⁸ (see link for full detail)

'Thoroughly clean'

'Thoroughly clean' means that the food handler vigorously washes the entire surface of his or her hands using soap or other effective means. Scientific studies have shown that to effectively remove pathogenic microorganisms, hands should be wet, well covered with soap and scrubbed for 15 to 30 seconds, including palms, between fingers, under nails, the back of hands, thumbs and wrists (Todd et al 2010a). Clean nail brushes may assist in scrubbing off dough and other hard-to-remove food residues. Hands should be thoroughly rinsed with clean water. Care must be taken to avoid re-contaminating washed hands, for example by using a clean paper towel or elbow to turn off taps that are manually operated.

6. <https://www.iso.org/iso-22000-food-safety-management.html>

7. <https://www.legislation.gov.au/Details/F2014C01204/Download>

8. http://www.foodstandards.gov.au/publications/Documents/Safe%20Food%20Australia/FSANZ%20Safe%20Food%20Australia_WEB.pdf

Canada

Safe Food for Canadians Act⁹

Governor in Council

51 (1) The Governor in Council may make regulations for carrying the purposes and provisions of this Act into effect, including regulations

(g) respecting quality management programs, quality control programs, safety programs or preventive control plans or any other similar programs or plans to be implemented by persons who conduct any activity regulated under this Act;

- (i) respecting the design, construction, hygiene, sanitation and maintenance of
- (i) establishments where any activity regulated under this Act is conducted,
 - (ii) the equipment and facilities in those establishments, or
 - (iii) conveyances and equipment used in connection with any activity regulated under this Act;

Federal/Provincial/Territorial Food Safety Committee (FPTFSC) - Food Retail and Food Services Code¹⁰

The Code consists of model requirements for safeguarding public health and assuring food safety. The Code provides practical, user-friendly interpretations and guidance for compliance with legislation.

5.1 Hand washing

b) A thorough hand washing includes vigorously rubbing together the surfaces of the hands and exposed arms with soap for at least 20 seconds followed by a thorough rinsing with warm potable running water. As well, particular attention should be given to the tips of the fingers and between all fingers.

2.15 Hand Wash Stations

a) At least one hand wash station must be provided in each food preparation and processing area. It must comply with the provisions of the National Building Code to the extent deemed necessary by the regulatory authority.

b) Hand wash facilities must:

- i) be located to allow convenient use by employees in food preparation, food dispensing and utensil washing areas, and constructed in such a way that avoids splashing of water into food or food contact surfaces;
- ii) be accessible for the use by employees at all times;
- iii) not be used for purposes other than hand washing;
- iv) be provided with soap dispensers (e.g., liquid soap) and sufficient single-service towels in a dispenser, or other drying apparatus that is approved by the regulatory authority;
- v) be equipped to provide hot and cold, or pre-mixed warm, running water set at a temperature of at least 38°C through a mixing valve or combination faucet;
- vi) provide an adequate flow of water. If a self-closing faucet is installed, it must flow for at least 20 seconds without the need to reactivate the faucet;

9. <http://laws-lois.justice.gc.ca/PDF/S-1.1.pdf>

10. <http://www.hss.gov.yk.ca/pdf/foodservicescode.pdf>

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vii) be equipped with a sign which explains proper hand washing procedures; and
viii) be easily cleanable and maintained in a clean and sanitary condition. c) If approved by the regulatory authority, when food handling or food exposure is limited, alternative hand washing facilities may be provided.

Code of Practice for Minimally Processed Ready-to-Eat Fruit and Vegetables¹¹

1.3 Sanitation Facilities

1.3.1 Employee Facilities

Employee hygiene facilities and toilets should be made available and be adequately maintained to prevent contamination.

- Adequate and conveniently located changing facilities and toilets should be provided in proximity to the processing operation areas.
- Facilities should provide adequate means to hygienically wash and dry hands, including wash basins, soap, disposable towels and a supply of hot and cold (or suitably temperature controlled) water.
- Toilet facilities should be designed to allow hygienic removal of waste and be located to avoid contamination of produce or premises.
- Toilet facilities should be maintained under sanitary conditions and good repair at all times.
- Hand washing notices should be posted in appropriate areas and in the language of employees

Chile

Reglamento Sanitario de los Alimentos Dto. N° 977/96 (D.OF. 13.05.97)¹² (Translation)

Sanitary Food Regulation

ARTICLE 32.- All establishments for the production, processing and processing of food must have suitably located changing rooms and sanitary services in accordance with the provisions of the Basic Sanitary and Environmental Conditions in Workplaces. 5 4 Letter added, as it appears in the text, by Art. 1, No. 1, of Dto. No. 68/05 of the Ministry of Health, published in the Official Gazette of 23.01.06 5 Regulation: Supreme Decree No. 594/99, of the Ministry of Health, published in the Official Gazette of 29.04.00 12 The hygiene services shall be well lit and ventilated and will not have direct communication with the area where food is handled. The sinks will have hot and cold water taps provided with soap to wash your hands and hygienic means to dry them, such as paper towels, hot air or others. Signs should be placed on staff to be required to wash their hands after using the services. Windows and other openings shall be provided with protective meshes against vectors.

Local de Elaboracion de Alimentos Tipo Envasadora¹³ (Translation)

Plant Food Processing Plant

5.10.

Hygienic services for personnel: Independent for each sex. With shower (if the activity causes bodily dirt) and sinks, with hot and cold water, in good State of operation and quantity according to the number

11. <http://www.inspection.gc.ca/food/fresh-fruits-and-vegetables/food-safety/minimally-processed-ready-to-eat-fruit-and-vegetables/eng/1413673339210/1413673388676?chap=3#s3c3>

12. http://www.ispch.cl/sites/default/files/documento/2013/02/RSA%20DECRETO_977_96_actualizado%202013.pdf

13. http://seremi13.redsalud.gob.cl/wrdprss_minsal/wp-content/uploads/2014/08/LOCAL-DE-ELABORACION-DE-ALIMEN.TOS-TIPO-ENVASADORA.pdf

of workers, or illuminated and ventilated, without direct communication to the area where they are handled Food no longer than 75 meters. You should also have signs that indicate compulsory to wash their hands after using the toilet. With their (Soap, hand-held drying system, etc.)

5.15.

Handwash: In sections where food is handled, with supplies of cold water and supplied with soap and hygienic system of drying hands.

People's Republic of China

Food Safety Law of the People's Republic of China¹⁴ (USDA Translation)

Chapter 4: Food Production and Distribution

(VIII) food production or distribution employees shall maintain personal hygiene, wash their hands, and dress in clean clothing and cap, and use sterilized and clean containers, vending tools, and equipment for food for direct consumption that does not have packaging;

(IX) food producers or distributors shall use water that complies with the national hygienic standard for drinking water;

(X) food producers or distributors shall use detergents and disinfectants that are safe and harmless to the human body;

(XI) other requirements as stipulated by laws and regulations

Hong Kong, China

Public Health and Municipal Services Ordinance (Cap. 132)¹⁵

56(2) Without prejudice to the generality of the provisions of subsection (1), regulations made under this section may make provision-

(c) for imposing requirements as to the provision, maintenance and cleanliness of sanitary and washing facilities in connection with such premises, the disposal of waste and the maintenance and cleanliness of apparatus, equipment, furnishings and utensils used in such premises, and in particular for imposing requirements that every sanitary convenience situated in such premises shall be supplied with water through a suitable flushing appliance;

Food Hygiene Code¹⁶

"In developing this Code, reference has been made to similar Codes issued by the Food Standards Australia New Zealand, the Canadian Food Inspection System Implementation Group, and the United States Food and Drug Administration."

14. https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Amended%20Food%20Safety%20Law%20of%20China_Beijing_China%20-%20Peoples%20Republic%20of_5-18-2015.pdf

15. http://www.cfs.gov.hk/english/food_leg/food_leg_part5.html#section56

16. http://www.fehd.gov.hk/english/publications/code/code_all.pdf

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2.8 Handwashing Facilities

(a) Every food room, kitchen and scullery area should be equipped with at least one wash hand basin for use by the staff. The standard of provision is one basin for every 20 staff.

(b) Wash hand basins should:

(i) be of permanent fixture, located where they can be easily accessible for use. For those provided for toilets, they should be located either inside the toilet or immediately adjacent to the toilet;

(ii) be of glazed earthenware or other materials that are smooth, durable, non-absorbent and easily cleaned, with a size of not less than 350 mm in length (measured between the top inner rims); and

(iii) be connected to public mains water supply or a source approved by the Food and Environmental Hygiene Department, preferably with both hot and cold water supplies. They should be fitted with a waste pipe with trap before being connected to a proper drainage system.

(c) If the water tap is to supply water intermittently, water should be allowed to run continuously for at least 20 seconds for every supply.

3.1.4 Handwashing Facilities

(a) Wash hand basins should be clean, equipped with adequate supply of cold water, preferably with hot water, and provided with liquid soap and suitable drying facilities.

Note: Failure to observe this is a breach of licensing condition.

(b) Liquid soap, which helps remove bacteria and dirt on hands, should be discharged from dispensers.

(c) Hand-drying facilities should be of single-use, such as clean paper towels, continuous cloth towel in dispensers or electric hand dryers. For continuous cloth towel in dispensers, the dispensers should be constructed in such a way that users can only retrieve the clean and unused portion of the cloth towel, which should also be dry, sanitized, unworn, of good quality and free of stains.

(d) Wash hand basins should be easily accessible for use by workers and customers. They should not be obstructed by articles to enable them to be conveniently used and cleaned.

(e) Wash hand basins should be used for the sole purpose of washing hands, arms and faces. They should be easily identified in some ways that they are used for such purpose only, say, by putting up a notice such as "For handwashing only" or "Not to be used for washing food or utensils", etc.

(f) If one compartment of a twin-sink is designated for handwashing, this compartment should be clearly indicated by a sign to such effect, and must not be used for any other purpose. Separate water taps should be provided to such twin-sinks.

(g) There should not be any draw-off taps other than wash hand basins in any yard or open space.

Indonesia

Government Regulation on Food Safety, Quality and Nutrition¹⁷

General Provisions

10. Sanitation requirements shall mean the standard hygiene and health that should be met as an effort to kill or prevent pathogenic microorganisms from living and to reduce the number of other microorganisms, so that the food produced and consumed does not risk human health and lives.

(2) The sanitation requirements as contemplated in paragraph (1) shall be regulated further by the Minister who is responsible for the field of health, which includes among others: a. facilities and/or infrastructure; b. activity implementation; and c. personnel

HK.03.1.23.04.12.2206 Good Food Production Industry for Household 2012¹⁸ (Translation of good manufacturing practices)

5. Facilities and Activities of Hygiene and Sanitation

a) Hygiene and Sanitary Facilities

(2) Means of Hygiene Employees Personnel hygiene facilities such as facilities for hand washing and toilet / latrine should be available in sufficient quantities and in a clean state to ensure the cleanliness of employees in order to prevent contamination of foodstuffs.

(3) Means of Handwashing should:

- (a) Placed near the production room, equipped with clean water and hand soap
- (b) Equipped with tools such as hand dryers towel, washcloth or a clean absorbent paper.
- (c) Equipped with a closed trash can.

Malaysia

Food Hygiene Regulations 2009 PU(A) 095/2009¹⁹

27. Wash-basin

(1) There shall be provided an adequate number of wash-basin suitably located and designated for washing hand.

(2) The wash-basin shall, at all times, be:-

- (a) supplied with adequate running water;
- (b) supplied with soap or suitable liquid detergent in a dispenser;
- (c) supplied with paper towel or automatic hand dryer;
- (d) kept clean and maintained in a good condition; and
- (e) equipped with non-hand operated taps for the use of food handler.

(3) There shall be different wash-basin for washing hand and washing food in food premises.

17. http://codexindonesia.bsn.go.id/uploads/download/PP_28-04%20English.pdf

18. <https://translate.google.com/translate?hl=en&sl=id&u=http://jdih.pom.go.id/showpdf.php%3Fu%3DHzfTWcVRSEozXrbd-VtEwFVOWM5%252BIRyY9T1%252BpEmsAHJI%253D&prev=search>

19. <http://webcache.googleusercontent.com/search?q=cache:O-dT9EfUegYJ:faolex.fao.org/docs/texts/mal91581.doc+&c-d=2&hl=en&ct=clnk&gl=us>

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New Zealand

Food Hygiene Regulations 1974 (Reprint as at 4 January 2017)²⁰

12 Maintenance of wash-hand basins in food premises

Every occupier of food premises shall ensure that all wash-hand basins in the premises are maintained in accordance with the following requirements:

- (a) there shall be provided at or conveniently by every wash-hand basin a nail brush, and an adequate supply of detergent, clean towels, paper towels, or roller towels presenting a clean surface to each user from a continuous roller towel dispenser, or other hand drying facilities approved for the purpose by an inspector; and
- (b) all wash-hand basins and hand washing facilities shall at all times be maintained in good repair and in a clean condition; and
- (c) all wash-hand basins shall have piped to them, at all times while the premises are being used, hot and cold running water, or tempered running water at a minimum temperature of 38°C.

Russia

SanPiN 2.3.2.1078-01 Hygienic Requirements for Safety and Nutrition Value of Foodstuff Sanitary and Epidemiologic Rules and Regulations²¹

1.1. Sanitary and epidemiologic rules and regulations “Hygienic requirements for safety and nutrition value of foodstuff (hereinafter – the Sanitary Rules) set forth hygienic requirements for safety and nutrition value of foodstuff for an individual as well as compliance requirements for the said regulations under manufacturing, importing and turnover of foodstuff.

Sanitary Rules and Norms SanPiN 2.3.4.050-96 “Production and sale of fish products”²²

4.3.2.1. The sections of preparation, processing and freezing of (blast freezing) of fishery products must be provided with:

- devices for the washing and disinfection of hands, single-use towels (manual operation of faucets is prohibited).

5.2.1.

- after the processing of infested fish the section must be cleaned and disinfected, including the equipment and tools; hands must be washed with soap and disinfected with 0,2% solution of chlorinated lime or another suitable disinfectant;

3.3.27. The production rooms must be provided with:

- wash-of faucets: 1 faucet per 150 m² of area (at least one faucet per room), supports for flexible hoses;

20. <http://www.legislation.govt.nz/regulation/public/1974/0169/latest/whole.html#DLM42658>

21. http://www.svssr.sk/dokumenty/zvierata/DCRF_4.pdf

22. http://www.svssr.sk/dokumenty/zvierata/DCRF_8.pdf

- for hand washing the rooms must be provided with sinks connected to cold and hot water, equipped with mixers and provided with soap, disinfecting fluid, single-use towels or electrical hand dryers. Sinks must be located in each production room at the entrance, at a distance of at most 15 m from each workplace, based on the norm of 1 mixer per 20 persons;
- for drinking purposes fountains or saturator devices must be located at a distance of at most 70 m from workplace;
- the temperature of drinking water should not exceed 15 °C. 3.3.28. The faucets in working rooms and toilets must not be manual.

Singapore

Sale of Food Act²³

- (2) Every person who is engaged in the preparation of food shall —
- (d) upon every occasion —
- (i) before commencing such preparation; or
- (ii) after visiting any urinal, water closet or other similar convenience and before resuming such preparation, wash his hands thoroughly with soap and clean water.

Wholesome Meat And Fish Act (Chapter 349a, Section 42) Wholesome Meat And Fish (Processing Establishments And Cold Stores) Rules²⁴

- (2) No person who is employed in a licensed processing establishment or cold store shall — (a) while handling any meat product, fish product or processing ingredient —
- (iv) wipe his hands on his clothing or with any other material other than a clean, single-use towel

United States

The United States Code of Federal Regulations (CFR) lists the current good manufacturing practices (GMPs) related to hand hygiene within food processing facilities. These regulations state broad requirements to engage in hand hygiene, however, limited guidance is provided for practically accomplishing this provision. Facility requirements and certain situational guidance are noted, however there is no procedural guidance. While cGMPs are also covered in individual States' policy, often times, States will refer directly to the CFR for these practices.²⁵ While the Food and Drug Administration's target audience for the Food Code - "retail and food service segment of the industry (restaurants and grocery stores and institutions such as nursing homes)" this document is also often used to fill the guidance gap for the food processing and agricultural side of the food sector.

Code of Federal Regulations - Title 21 Current Good Manufacturing Practice, Hazard Analysis, and Risk-based Preventive Controls for Human Food²⁶

Section 117.37 Sanitary facilities and controls.

23. http://www.ava.gov.sg/docs/default-source/legislation/sale-of-food-act/56web_sof_foodestablishmentsregulations.pdf

24. http://www.ava.gov.sg/docs/default-source/legislation/wholesome-meat-and-fish-act/60web_wmf_processingestablishmentsandcoldstoresrul.pdf

25. <https://www.tn.gov/agriculture/topic/ag-businesses-good-manufacturing-practices>

26. https://www.ecfr.gov/cgi-bin/text-idx?SID=e9ca025764f8adff02bc93a2655d8450&mc=true&node=pt21.2.117&rgn=div5#se21.2.117_137

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(e) Hand-washing facilities. Each plant must provide hand-washing facilities designed to ensure that an employee's hands are not a source of contamination of food, food-contact surfaces, or food-packaging materials, by providing facilities that are adequate, convenient, and furnish running water at a suitable temperature.

Code of Federal Regulations - Title 21 Current Good Manufacturing Practice in Manufacturing, Packing, or Holding Human Food²⁷

Section 110.10 Personnel

(b) *Cleanliness*. **All persons working in direct contact with food, food-contact surfaces, and food-packaging materials shall conform to hygienic practices while on duty to the extent necessary to protect against contamination of food. The methods for maintaining cleanliness include, but are not limited to:**

- (3) Washing hands thoroughly (and sanitizing if necessary to protect against contamination with undesirable microorganisms) in an adequate hand-washing facility before starting work, after each absence from the work station, and at any other time when the hands may have become soiled or contaminated.

Section 110.37 Sanitary facilities and controls.

(e) *Hand-washing facilities*. **Hand-washing facilities shall be adequate and convenient and be furnished with running water at a suitable temperature. Compliance with this requirement may be accomplished by providing:**

- (1) Hand-washing and, where appropriate, hand-sanitizing facilities at each location in the plant where good sanitary practices require employees to wash and/or sanitize their hands.
- (2) Effective hand-cleaning and sanitizing preparations.
- (3) Sanitary towel service or suitable drying devices.
- (4) Devices or fixtures, such as water control valves, so designed and constructed to protect against recontamination of clean, sanitized hands.
- (5) Readily understandable signs directing employees handling unprotected food, unprotected food-packaging materials, of food-contact surfaces to wash and, where appropriate, sanitize their hands before they start work, after each absence from post of duty, and when their hands may have become soiled or contaminated. These signs may be posted in the processing room(s) and in all other areas where employees may handle such food, materials, or surfaces.
- (6) Refuse receptacles that are constructed and maintained in a manner that protects against contamination of food.

FDA Food Code - 2013²⁸ (See link for full detail)

(A) Except as specified in ¶ (D) of this section, FOOD EMPLOYEES shall clean their hands and exposed portions of their arms, including surrogate prosthetic devices for hands or arms for at least 20 seconds,

27. https://www.ecfr.gov/cgi-bin/text-idx?SID=bd97c5c987c0482b852015d0f73039a2&mc=true&node=se21.2.110_137&rgn=d_iv8

28. <https://www.fda.gov/downloads/Food/GuidanceRegulation/RetailFoodProtection/FoodCode/JCM374510.pdf>

using a cleaning compound in a HAND WASHING SINK that is equipped as specified under § 5-202.12 and Subpart 6-301.

(B) FOOD EMPLOYEES shall use the following cleaning procedure in the order stated to clean their hands and exposed portions of their arms, including surrogate prosthetic devices for hands and arms:

- (1) Rinse under clean, running warm water;
- (2) Apply an amount of cleaning compound recommended by the cleaning compound manufacturer;
- (3) Rub together vigorously for at least 10 to 15 seconds while:
 - (a) Paying particular attention to removing soil from underneath the fingernails during the cleaning procedure,
 - (b) Creating friction on the surfaces of the hands and arms or surrogate prosthetic devices for hands and arms, finger tips, and areas between the fingers;
- (4) Thoroughly rinse under clean, running warm water;
- (5) Immediately follow the cleaning procedure with thorough drying using a method as specified under § 6-301.12.

6-301.12 Hand Drying Provision.

Each HANDWASHING SINK or group of adjacent HANDWASHING SINKS shall be provided with:

- (A) Individual, disposable towels;
- (B) A continuous towel system that supplies the user with a clean towel; or
- (C) A heated-air hand drying device; or
- (D) A hand drying device that employs an air-knife system that delivers high velocity, pressurized air at ambient temperatures.

Viet Nam

Law on Food Safety /2010/-QH12²⁹ (Translated by USDA)

Article 19

Conditions for ensuring safety of food in respect to establishments producing and trading food

1. Establishment producing or trading food shall have to meet the following conditions:

- a) Having a location with appropriate area and safe distance from toxic and contamination sources and other harmful factors.
- b) Having enough water meeting the technical regulations for producing and trading food.
- c) Having sufficient and appropriate equipment and facilities to treat, process, pack, preserve and transport various categories of food; having sufficient equipment, tools and means for washing and disinfection, antiseptic water, equipment for preventing and fighting harmful insects and animals.
- d) Having waste treatment system which is regularly operated in accordance with the laws on protection of the environment.
- dd) Maintaining the conditions for ensuring the safety of food and archiving documents on origin of food materials and other documents relating to the entire process of production and trading of food.
- e) Comply with the regulations on health, knowledge and practices of people directly involved in producing and trading food.

29. https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Food%20Safety%20Law%20and%20Guiding%20Decree%20Released_Hanoi_Vietnam_6-12-2013.pdf

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2. The Minister of Health, the Minister of Agriculture and Rural Development and the Minister of Industry and Trade shall promulgate the national technical regulations and specific regulations on the conditions for ensuring safety of food with respect to establishments producing and trading food in the sector which is assigned to them to manage

Số: 38/2012/NĐ-CP Decree – Detailed Implementation Rules of the Food Safety Law^{30, 31}

(Translated)

Article 5

A dossier of regulation conformity announcement for a product with technical regulation

1. Interpretation of technical-regulation conformity results based on the certification of technical-regulation conformity certification organization (the third party), including:

A / The regulation conformity announcement is prescribed in Form No. 02 promulgated together with this Decree;

B / The detailed product information, prescribed in Form No. 03a or Form No. 03c, promulgated together with this Decree (affixed with the seal of third parties);

C / The third party's certificate of conformity certification (notarized copy or copy with originals for comparison);

D) Certificates conforming to HACCP or ISO 22000 or equivalent standards in cases where organizations or individuals producing products with quality management systems are HACCP-compliant or ISO 22000 certified or equivalent. Notarized copy or copied original for comparison).

Non-APEC Contexts

European Union

The European Union's general food safety laws are the Regulation (EC) No 852/2004 which applies to all foodstuffs and the Regulation (EC) No 853/2004³² which applies to specified foods. These laws apply throughout the EU however, individual economies submit guides to the EC Library on how to achieve compliance within each country. Registered country guides are produced through in-country standards organizations, (private or public) resulting de facto mandatory guidelines for each country.

One barrier relevant to hand hygiene protocol, and food safety in general, is the issue of a paywall when attempting to access private standards. Without an international guide for reference such as Codex, there is limited accessible guidance regarding the application of the broad EU standards. The potential for using inferior options increases given the need to pay for the alternative information.

30. http://vanban.chinhphu.vn/portal/page/portal/chinhphu/hethongvanban?class_id=1&_page=1&mode=detail&document_id=158155

31. https://translate.google.com/translate?hl=en&sl=vi&u=http://datafile.chinhphu.vn/file-remote-v2/DownloadServlet%3F-filePath%3Dvbppq/2012/05/38ND_PL_doc&prev=search

32. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:139:0055:0205:en:PDF>

Regulation (EC) No 852/2004 of the European Parliament and of the Council of 29 April 2004 on the Hygiene of Foodstuffs³³

“An adequate number of washbasins is to be available, suitably located and designated for cleaning hands. Washbasins for cleaning hands are to be provided with hot and cold running water, materials for cleaning hands and for hygienic drying. Where necessary, the facilities for washing food are to be separate from the hand-washing facility.”

Commission Notice

On the implementation of food safety management systems covering prerequisite programs (PRPs) and procedures based on the HACCP principles, including the facilitation/flexibility of the implementation in certain food businesses (2016/C 278/01)³⁴

“while each establishment must comply with the legal requirements in Section 1 of this Annex. The PRPs below are therefore possible examples how to comply with the legal requirements in practice.”

“i) Hand washing facilities should be positioned conveniently between toilets/changing rooms and the food handling area; disinfectants/soap and towels for single use should be available; installations blowing warm air should only be present in rooms without food and non-hand-operable taps are desirable.”

Ireland

The Food Safety Authority of Ireland (FSAI) uses the private standards organization National Standards Authority of Ireland (NSAI) to set country-wide operating procedures related to food safety. Two NSAI standards have been officially logged in the EU registry. By law, all food business operators must comply with Irish and EU legislation governing food hygiene. The legal requirements for catering and food retail businesses are set out in two Irish Standards certified by NSAI³⁵:

- I.S. 340:2007 Hygiene in Catering (2006 Draft version³⁶)
- I.S. 341:2007 Hygiene in Food Retailing and Wholesaling.

These two voluntary Standards provide guidance on how to achieve compliance with the relevant legislation.

I.S. 340:2007 Hygiene in Catering

3.2.3.3 The hand washing facilities shall have

- a) constant and adequate supply of hot and cold water
- b) liquid soap in appropriate dispensers
- c) a suitable method of hand drying available at each hand wash unit e.g. paper towels from a dispenser with an easy to clean waste receptacle or cabinet roller towels. Air hand dryers shall not be used in food operation areas.

33. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:139:0001:0054:en:PDF>

34. [http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52016XC0730\(01\)#ntr2-C_2016278EN.01000501-E0002](http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52016XC0730(01)#ntr2-C_2016278EN.01000501-E0002)

35. https://www.fsai.ie/food_businesses/starting_business/food_hygiene_legislation.html

36. <http://www.cmai.ie/Downloads/NSAI%20Hygiene%20document%20revised.pdf>

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India

Food Safety and Standards (Licensing and Registration of Food Businesses), Regulations 2011³⁷

3.4 Changing Facilities and Toilets.- Suitable and conveniently located changing facilities and toilets should be provided in all establishments. Toilets should be so designed as to ensure hygienic removal of waste matter. These areas should be well lit and ventilated and should not open directly on to food handling areas. Hand washing facilities with warm or hot and cold water with suitable hygienic means of drying hands should be provided adjacent to toilets and in such a position that the employee must pass them when returning to the processing area. Where hot and cold water are available, mixing taps should be provided. Where paper towels are used, a sufficient number of dispensers and receptacles should be provided near to each washing facility. Taps of non-hand operable type are preferable. Notices should be posted directing personnel to wash their hands after using the toilets.

3.5 Hand Washing Facilities in Processing Areas:

3.5.1 Adequate and conveniently located facilities for hand washing and drying should be provided wherever the process demands. Where appropriate, facilities for hand disinfection should be provided. The facilities should be furnished with properly trapped waste pipes leading to drains.

South Africa

Regulations Governing General Hygiene Requirements for Food Premises and the Transport of Food³⁸

The following shall be available in respect of food premises:

(ii) hand-washing facilities which shall be provided with cold and/or hot water for the washing of hands by workers on the food premises and by persons to whom food is served for consumption on the food premises, together with a supply of soap (or other cleaning agents) and clean disposable hand-drying equipment for the cleansing and drying of hands by such workers and person;

United Kingdom

Food Hygiene – A Guide for Businesses³⁹ (separated into the EC requirements and UK recommendations)

Handwashing facilities and toilets (Law)

You must have an adequate number of flush lavatories, connected to an effective drainage system. Toilets must not open directly into rooms where you handle food. You must have an adequate number of washbasins, suitably located and used only for cleaning hands. Washbasins for cleaning hands must have hot and cold running water, soap and materials for hygienic drying. Where necessary, you should have a separate sink for washing food.

Handwashing (best practice)

37. [http://old.fssai.gov.in/Portals/0/Pdf/Food%20safety%20and%20Standards%20\(Licensing%20and%20Registration%20of%20Food%20businesses\)%20regulation.%202011.pdf](http://old.fssai.gov.in/Portals/0/Pdf/Food%20safety%20and%20Standards%20(Licensing%20and%20Registration%20of%20Food%20businesses)%20regulation.%202011.pdf)

38. http://www.ehm.co.za/download/reg_food.pdf

39. <https://www.food.gov.uk/sites/default/files/multimedia/pdfs/publication/hygienebooklet.pdf>

Effective handwashing is extremely important to help prevent harmful bacteria from spreading from people's hands to food, work surfaces, equipment etc. Make sure that all staff that work with food wash their hands properly:

when entering the food handling area, e.g. after a break or going to the toilet

before preparing food

after touching raw food, such as meat/poultry, fish, eggs and unwashed fruit and vegetables

after handling food waste or emptying a bin

after cleaning

after blowing their nose

after touching phones, light switches, door handles and cash registers, or other surfaces that could come into contact with staff handling raw food

Don't forget that staff should dry hands thoroughly on a disposable towel – harmful bacteria can spread more easily if your hands are wet or damp. Use the disposable towel to turn off the tap.

United Arab Emirates (Dubai)

Food Code⁴⁰

2.18 Handwash Stations

a. At least one handwash station shall be provided in each food preparation area. Additional handwash stations may be required depending on the type and extent of activity.

b. Handwash facilities shall:

i be located to allow convenient access and use by food handlers and other workers;

ii be equipped with single-use liquid soap dispensers and paper hand towel dispensers;

iii provide an adequate flow of water at a suitable temperature (not too cold nor too hot); iv be easily cleanable, and maintained in a clean and sanitary condition;

v indicated with clear signboards and not be used for purposes other than hand washing.

Rationale: Improper hand washing is a major contributing factor to outbreaks of foodborne illnesses. Provision of proper and adequate hand washing facilities is essential to minimising food contamination and maintaining personal hygiene. The temperature of the water should be suitable to encourage handwashing. If the water is too hot or too cold, employees might have a tendency to avoid handwashing.

Private Food Industry Schemes

The Global Food Safety Initiative⁴¹ (GFSI) is a privately organized benchmarking association established by the Consumer Goods Forum. The GFSI was created to provide harmonized standards for food safety globally to the benefit of both food business operators and consumers. Each food safety scheme accredited by the GFSI is understood to meet, at a minimum, the international criteria for food safety as well as the GFSI developed standards, giving rise to their motto "once certified, accepted everywhere". Within certain GFSI standards, hand hygiene protocol varies.

40. <https://www.dm.gov.ae/wps/wcm/connect/3f7706a6-9271-40dd-a3df-0eb99c14fe4b/Food+Code.pdf?MOD=AJPERES>

41. <http://www.mygfsi.com/>

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British Retail Consortium (BRC) - Global Standard for Food Safety Issue 7⁴²

4.86 Suitable and sufficient hand-washing facilities shall be provided at access to, and at other appropriate points within, production areas. Such hand-washing facilities shall provide as a minimum:

- advisory signs to prompt hand-washing
- a sufficient quantity of water at a suitable temperature
- water taps with hands-free operation
- liquid/foam soap
- single-use towels or suitably designed and located air driers

Safe Quality Food Institute⁴³

11.3.2.1 Hand wash basins shall be provided adjacent to all personnel access points and in accessible locations throughout food handling and processing areas as required.

11.3.2.2 Hand wash basins shall be constructed of stainless steel or similar non-corrosive material and as a minimum supplied with:

- i. A potable water supply at an appropriate temperature;
- ii. Liquid soap contained within a fixed dispenser;
- iii. Paper towels in a hands free cleanable dispenser; and
- iv. A means of containing used paper towels.

11.3.2.3 The following additional facilities shall be provided in high risk areas:

- i. Hands free operated taps; and
- ii. Hand sanitizers.

11.3.2.4 A sign instructing people to wash their hands, and in appropriate languages, shall be provided in a prominent position.

11.3.2.5 Personnel shall have clean hands and hands shall be washed by all personnel, including staff, contractors and visitors:

- i. On entering food handling or processing areas;
- ii. After each visit to a toilet;
- iii. After using a handkerchief;
- iv. After smoking, eating or drinking; and v. After handling wash down hoses, dropped product or contaminated material.

IFS – Food⁴⁴

3.4.6 Adequate hand hygiene facilities shall be provided at access points to and within production areas, as well as at staff facilities. Based on hazard analysis and assessment of associated risks, further areas (e.g. packaging area) shall be similarly equipped.

3.4.7 Hand washing facilities shall provide as a minimum:

- running potable water at an appropriate temperature
- liquid soap
- appropriate equipment for hand drying.

42. <http://www.brcbookshop.com/p/1656/brc-global-standard-for-food-safety-issue-7-us-free-pdf>

43. <https://goo.gl/FLv1KU>

44. <https://www.ifs-certification.com/index.php/en/standards/251-ifs-food-en>

Annex

Document	Relevant Language
<p>CAC/GL 22R - 1997 REGIONAL GUIDELINES FOR THE DESIGN OF CONTROL MEASURES FOR STREET-VENDED FOODS (AFRICA)</p>	<p>3.4.4 Personnel Hygiene Facilities and Toilets Personnel hygiene facilities should be available to ensure that an appropriate degree of personal hygiene can be maintained and to avoid contaminating food. Where appropriate, facilities should include:</p> <ul style="list-style-type: none"> • adequate means of hygienically washing and drying hands, including wash basins and a supply of hot and cold (or suitably temperature controlled) water;
<p>(CAC/GL 53-2003) GUIDELINES ON THE JUDGEMENT OF EQUIVALENCE OF SANITARY MEASURES ASSOCIATED WITH FOOD INSPECTION AND CERTIFICATION SYSTEMS</p>	<p>Equivalence of sanitary measures: Equivalence is the state wherein sanitary measures applied in an exporting country, though different from the measures applied in an importing country, achieve, as demonstrated by the exporting country, the importing country's appropriate level of sanitary protection.</p> <p>SECTION 4 – GENERAL PRINCIPLES FOR THE DETERMINATION OF EQUIVALENCE 7. Determination of the equivalence of sanitary measures associated with food inspection and certification systems should be based on application of the following principles:</p> <p>a) An importing country has the right to set a level of sanitary protection it deems appropriate in relation to the protection of human life and health.⁶ The ALOP may be expressed in qualitative or quantitative terms.</p> <p>b) The sanitary measure⁷ applied in an importing country should in practice achieve the ALOP of the importing country and be applied consistent with article 2.3 of the SPS agreement.⁸</p> <p>c) An importing country should describe how its own sanitary measure achieves its ALOP.</p> <p>d) An importing country should recognize that sanitary measures different from its own may be capable of achieving its ALOP, and can therefore be found to be equivalent.</p> <p>e) The sanitary measure that the exporting country proposes as equivalent must be capable of achieving the importing country's ALOP.</p> <p>f) An importing country should, upon request by an exporting country, promptly enter into consultations with the aim of determining the equivalence of specified sanitary measures within a reasonable period of time.⁹</p> <p>g) It is the responsibility of the exporting country to objectively demonstrate that its sanitary measure can achieve the importing country's ALOP. h) The comparison of economies' sanitary measures should be carried out in an objective manner.</p> <p>i) Where risk assessment is used in the demonstration of equivalence, economies should strive to achieve consistency in the techniques applied, using internationally accepted</p>

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<p>(CAC/GL 61-2007) GUIDELINES ON THE APPLICATION OF GENERAL PRINCIPLES OF FOOD HYGIENE TO THE CONTROL OF LISTERIA MONOCYTOGENES IN FOODS</p>	<p>Good Hygienic Practices (GHPs) as specified in the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969) and other applicable codes of hygienic practice should be suitable to control <i>L. monocytogenes</i> in non ready-to-eat foods. However, the additional measures described in the following guidelines should be consulted and implemented, as necessary to control <i>L. monocytogenes</i> in ready-to-eat foods.</p> <p>4.4.4 Personnel hygiene facilities and toilets Refer to the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969).</p>
<p>(CAC/GL 63-2007) PRINCIPLES AND GUIDELINES FOR THE CONDUCT OF MICROBIOLOGICAL RISK MANAGEMENT (MRM)</p>	<p>A food safety issue arises where one or more foodborne microbial hazard(s) are known or thought to be associated with one or many food(s) and thus requires consideration of a risk manager. The risk manager follows the MRM process to evaluate and where necessary manage the associated risk. At the start of this process, the food safety issue should be clearly identified and communicated from the risk managers to risk assessors, as well as affected consumers and industry.</p> <p>Food safety issue identification may be performed by the risk manager or be the result of collaboration between different interested parties. Within Codex, a food safety issue may be raised by a member government, or by an intergovernmental or observer organization.</p> <p>Food safety issues may be identified on the basis of information arising from a variety of sources, such as surveys of the prevalence and concentration of hazards in the food chain or the environment, human disease surveillance data, epidemiological or clinical studies, laboratory studies, scientific, technological or medical advances, lack of compliance with standards, recommendations of experts, public input, etc.</p> <p>When there is evidence that a risk to human health exists but scientific data are insufficient or incomplete, it may be appropriate for economies to select a provisional decision, while obtaining additional information that may inform and, if necessary, modify the provisional decision. In those instances, the provisional nature of the decision should be communicated to all interested parties and the timeframe or circumstances under which the provisional decision will be reconsidered (e.g. reconsideration after the completion of a MRA) should be articulated when the decision is communicated initially).</p>
<p>(CAC/GL 73-2010) GUIDELINES ON THE APPLICATION OF GENERAL PRINCIPLES OF FOOD HYGIENE TO THE CONTROL OF PATHOGENIC VIBRIO SPECIES IN SEAFOOD</p>	<p>No mention of alternative to the General Principles of Food Hygiene</p>
<p>(CAC/GL 78-2011) GUIDELINES FOR THE CONTROL OF CAMPYLOBACTER AND SALMONELLA IN CHICKEN MEAT</p>	<p>10.6.1 GHP-based control measures</p> <p>109. Consumer education should focus on handling, hand washing, cooking, storage, thawing, prevention of cross contamination, and prevention of temperature abuse. The <u>WHO Five keys to safer food</u> assists in this process.</p>

<p>(CAC/GL 79-2012) GUIDELINES ON THE APPLICATION OF GENERAL PRINCIPLES OF FOOD HYGIENE TO THE CONTROL OF VIRUSES IN FOOD</p>	<p>SECTION 4 - ESTABLISHMENT: DESIGN AND FACILITIES OBJECTIVES: Equipment and facilities should be designed, constructed and laid out to ensure that surfaces can be cleaned and disinfected if needed. RATIONALE: Inability to properly clean and disinfect may result in persistence of the virus leading to potential contamination of food.</p> <p>4.4.4.2 Hand washing facilities 24. Hand washing facilities should be supplied with hand cleanser (soap). Where possible, hand washing facilities should have nonhand operable taps and single-use towels to help prevent the re-contamination of clean hands. Hand washing and drying instructions should be visibly present for all users of these facilities</p> <p>. 25. Hand washing and drying facilities should be suitably located in food preparation or production areas to ensure food handlers have ready access to them. There should be hand washing facilities within close proximity to the toilets and positioned so that the personnel must pass by them before returning to the food handling area.</p> <p>SECTION 7 – ESTABLISHMENT: PERSONAL HYGIENE OBJECTIVES: To prevent food handlers from contaminating food with viruses, in particular NoV and/or HAV due to poor personal hygiene. RATIONALE: Food handlers may shed virus and the infectious dose is very low. There is a need for strict personal hygiene of food handlers, particularly in relation to the prevention of NoV and/or HAV, contamination.</p> <p>7.3 Personal cleanliness 52. Personal hygiene of <u>food handlers</u> is critical. Food handlers should be aware of the infectious nature and transmission routes of enteric viruses, such as NoV and HAV. As asymptomatic shedding can occur, food handlers should adhere to hand washing instructions at all times. Training should be provided for food handlers, managers and other company personnel (see Section 10).</p> <p>53. Hands should be washed and dried before handling of food. The most effective way of preventing spread of viruses is thorough hand washing. Hands should be lathered with soap and then washed with clean running water³. The use of disposable hand towels and non-hand operable taps should be encouraged wherever possible. Hands should be washed in sinks dedicated to such a purpose and not washed in dishwashing sinks or food preparation sinks, to the extent possible.</p>
<p>(CAC/GL 87-2016) GUIDELINES FOR THE CONTROL OF NONTYPHOIDAL SALMONELLA SPP. IN BEEF AND PORK MEAT</p>	<p>9. CONTROL MEASURES FOR DISTRIBUTION CHANNELS (STEPS 21 TO 27)</p> <p>9.7.1 GHP-based control measures Consumers should be informed about the potential risk associated with finished beef product in order to follow instructions and make informed choices on how to avoid the spread and growth of Salmonella (e.g. storage, thawing and cooking temperatures, hygiene including hand washing). The WHO Five Keys to Safer Food assists in this process.</p>
<p>(CAC/GL 88-2016) GUIDELINES ON THE APPLICATION OF GENERAL PRINCIPLES OF FOOD HYGIENE TO THE CONTROL OF FOODBORNE PARASITES</p>	<p>3.3 Cleaning, maintenance and personnel hygiene at primary production Refer to the relevant Chapters of the OIE Terrestrial Animal Health Code for recommendations on cleaning, disinfection and personal hygiene</p>

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<p>(CAC/RCP 52-2003) CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS</p>	<p>3.5.1 Facilities and equipment Facilities and equipment should include:</p> <ul style="list-style-type: none"> • Adequate means to hygienically wash and dry hands. • Adequate toilet and changing facilities for personnel should be suitably located and designated
<p>(CAC/RCP 58-2005) CODE OF HYGIENIC PRACTICE FOR MEAT</p>	<p>All areas in which exposed meat may be present, should be equipped with adequate facilities for washing hands that:</p> <ul style="list-style-type: none"> • are located convenient to work stations; • have taps that are not operable by hand; • supply water at an appropriate temperature, and are fitted with dispensers for liquid soap or other hand cleansing agents; • include hand drying equipment where necessary, and receptacles for discarded paper towels; and • have waste water ducted to drains.
<p>(CAC/RCP 53-2003) CODE OF HYGIENIC PRACTICE FOR FRESH FRUITS AND VEGETABLES</p>	<p>***Main document makes many references to the General Principles of Food Hygiene, however the specific products make more specific claims such as those to the WHO guidelines***</p> <p>3.2.3.1 Personnel hygiene and sanitary facilities (HYGIENIC PRIMARY PRODUCTION OF FRESH LEAFY VEGETABLES)</p> <p>As far as possible, such facilities should be located close to the field and readily accessible to the work area:</p> <ul style="list-style-type: none"> • Facilities should include clean running water, soap, toilet paper or equivalent, and single use paper towels or equivalent. <p>3.2.3.1 Personnel hygiene and sanitary facilities HYGIENIC PRIMARY PRODUCTION OF MELONS</p> <p>□ Facilities should include clean running water, soap, toilet paper or equivalent, and single use paper towels or equivalent. Multiple use cloth drying towels should not be used. Hand sanitizers should not replace hand washing and should be used only after hands have been washed.</p> <ul style="list-style-type: none"> • SECTION 9 – PRODUCT INFORMATION AND CONSUMER AWARENESS • Correct hand washing methods(4) - The (4) is a reference to the WHO Guidelines on Hand Hygiene in Health Care <p>3.2.3.1 HYGIENIC PRIMARY PRODUCTION OF BERRIES</p> <ul style="list-style-type: none"> • Facilities should include clean running water, soap, toilet paper or equivalent, and single use paper towels or equivalent. Multiple use cloth drying towels should not be used. Hand sanitizers should not replace hand washing and should be used only after hands have been washed.
<p>(CAC/RCP 75-2015) CODE OF HYGIENIC PRACTICE FOR LOW-MOISTURE FOODS</p>	<p>5.2.4 Microbiological cross-contamination</p> <p>The most stringent hygienic practices should be in place following a pathogen reduction step to prevent recontamination during subsequent manufacturing and packaging. The traffic (e.g. movement of personnel and materials) between one hygiene area and another should be controlled to minimize the potential for pathogen contamination. The following should be considered for an area requiring a higher degree of hygienic control:</p> <ul style="list-style-type: none"> • Traffic into the area should be minimized and strictly controlled. • Personnel should follow established hygiene procedures prior to entering the area, e.g. changing or covering shoes, washing and drying hands.

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