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Summary of global guidance, guidelines or recommendations to prevent food workers from  
acquiring COVID-19

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Summary of global guidance, guidelines or recommendations to prevent food workers from  
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## **Abstract**

Summary of global guidance, guidelines or recommendations to prevent food workers from acquiring COVID-19

By Kyoko Kawamoto

In the coronavirus disease (COVID-19) pandemic, many countries and regions have provided the public with guidelines or guidance to protect people from this disease. In the pandemic, food workers are essential workers undertaking risks for society; however, food workers did not receive the same level of support as workers from other industries such as healthcare workers. Therefore, it would be helpful for employers or management to comprehend guidelines or guidance on the pandemic to understand potential risks at workplaces and protect food workers from COVID-19. The study aims to summarize guidance, guidelines, or recommendations globally to prevent food workers from acquiring COVID-19 in English or Japanese-speaking regions/countries. The identification and selection of documents followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines with modifications. Initially, 1847 documents were identified. After the screenings, thirty-five documents were selected for review from the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO), Europe, the UK, the U.S., Canada, Australia, New Zealand, and Japan. Most documents from the regions and countries described a certain distancing that people maintain, controls that employers plan, and briefly described ventilation in workplaces such as good airflow. Some, but not all regions and countries, had guidance to address the risks regarding shared accommodation and transportation, such as close and prolonged contact among people. Next, most of the documents described hand hygiene including hand-washing, cleaning and sanitation, such as disinfection of high-touch surfaces, and face coverings. Furthermore, most of the documents contained practices regarding screening of workers' conditions, management of symptomatic workers, and training of workers. In conclusion, this review has summarized the guidance of selected regions and countries to protect food workers from acquiring COVID-19. The results showed similarities in main components and the differences in the details of practices, such as how to address when a defined distancing is not achievable, among the countries. The results would be helpful for public health experts and researchers who intend to conduct interventions or research of the food industry during the pandemic.

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## **Chapter 1. Literature Review**

### **1.1. Importance of Guidance and Guidelines under the COVID-19 pandemic**

#### ***COVID-19 pandemic***

Coronavirus disease (COVID-19) is an infectious disease caused by the COVID-19 virus [1] and has widespread globally. As of July 14, 2021, more than 187.5 million cases including more than 4.0 million deaths have been confirmed globally, and more than 33.5 million cases in the U.S. have been reported [2]. In the Americas, more than 74.0 million cases have been confirmed, and in Europe, more than 57.3 million cases have been reported [2]. COVID-19 infections have also been confirmed in other regions: in South-East Asia with more than 36.1 million cases, in Eastern Mediterranean with more than 11.5 million cases, in Africa with more than 4.4 million cases, and in Western Pacific with more than 3.8 million cases [2]. The COVID-19 virus spreads mainly through saliva droplets, coughs, or sneezes of infected persons [1], and COVID-19 spreads when infected persons exhale droplets and very small particles that contain the virus [3]. It is very important that people are well informed about the COVID-19 virus, the disease, and the ways of spreading to prevent and reduce transmission of this disease [1].

#### ***Importance of understanding COVID related guidelines/guidance/recommendation***

Responding to this global pandemic, international institutions have shared COVID-19 related information, including guidelines/guidance, and/or recommendations/advice [4-6]. For example, the World Health Organization (WHO) shared on their website advice for the public relating to COVID-19, such as advice about how to protect people themselves and others from COVID-19, how to make their environment safer, attention to good hygiene, and actions to be completed when people feel unwell [5]. Also, the WHO issued much technical guidance, including guidance



regarding critical preparedness, readiness, and response actions for COVID-19 [4]. The United Nations (UN) Secretary-General initiated the UN Comprehensive Response to COVID-19, which promotes three pillars of operation: the delivery of health response, an adoption of policies, and a recovery process [6].

Many countries and regions also have provided the public with COVID-19 related, guidelines, guidance, and/or recommendations/advice, to protect people from this disease [7-14]. The Center for Disease Control and Prevention (CDC) in the U.S. shared information about people's health, including key information about COVID-19, the symptoms, what to do when being sick, and how to prevent getting sick [7]. For instance, in the CDC page for how to protect people, practices for prevention were described in detail as guidance for unvaccinated people [8]. Similarly, the official website of the Government of Canada provided the information concerning prevention and risks of COVID-19, such as how the disease spreads, prevention, and risk of getting this disease [9]. In the same way, the European Centre for Disease Prevention and Control (ECDC) described how to protect people on the website [10]. Additionally, the Ministry of Health, Labour and Welfare (MHLW) of Japan provided information about Novel Coronavirus (COVID-19) on their website, including the explanation about "five situations", which increase the risk for infection [11]. Further, the World Health Organization, Regional Officer for the Eastern Mediterranean provided information about this disease on their website, such as how do people get an infection with this disease, and mask related information [12]. In addition, the website of the National Centre for Disease Control, Ministry of Health & Family Welfare, Government of India had pages for COVID-19, including, pages for standard operating procedures (SOPs), training materials, and guidelines [13]. Moreover, the home page of GOV.UK provided much information about COVID-

19, including situations of Coronavirus restrictions, recent and upcoming changes, guidance and support, and statistics [14]. As shown above, many governments/regional institutions, including in the U.S., Canada, Europe, and Eastern Mediterranean have provided COVID-19 related information for the public [7-14]. COVID-19 related information is written in each countries' languages [7-15].

## **1.2. Essential Workers under the COVID-19 pandemic**

Critical infrastructure sectors are vital during the COVID-19 pandemic for public health, safety, and community well-being [16]. The International Labor Organization (ILO) has defined essential services as “those the interruption of which would endanger the life, personal safety or health of the whole or part of the population” [17]. Although what is defined as “essential” is context specific, during the COVID-19 pandemic, essential workers have to continue working and providing services [18]. In the U.S., there are 16 critical infrastructure sectors identified by Cybersecurity & Infra-structure Security Agency (CISA), including the Emergency Services Sector, the Healthcare and Public Health Sector, the Water and Wastewater Systems Sector, the Transportation Systems Sector, the Energy Sector, and the Food and Agriculture Sector [19]. Since it is important to provide considerations regarding the essential workers, the Guidance on the Essential Critical Infrastructure Workforce was issued in which essential workers that need specialized strategies for risk management were identified [19, 20]. In Canada, the “Guidance on Essential Services and Functions in Canada During the COVID-19 Pandemic” was provided, and the National Strategy for Critical Infrastructure classified ten critical infrastructures which are essential to save a life, health, and basic social functions, including Energy and Utilities,

Information and Communication Technologies, Finance, Health, Food, Water, Transportation, Safety, Government, and Manufacturing [21].

Essential workers undertake risks for the benefit of society in the pandemic, and health care workers are the most visible among them while food workers are often invisible [22]. Healthcare and public health workers are the most well-known essential workers [22], and the protection of them from COVID-19 is essential to provide critical public health services [23]. Thus, a lot of guidance, recommendations, and/or information relating to health workers under the COVID-19 pandemic has been issued [24-26]. For instance, the WHO started a year-long campaign in 2021 with the theme, “Protect. Invest. Together”, which highlights the urgent need to invest in health workers to ensure appropriate protection and conditions of health workers’ work [24]. The WHO states that people have a moral obligation to protect health and care workers because the workers have protected the world under COVID-19 [24]. The ECDC updated the document, “Infection prevention and control and preparedness for COVID-19 in healthcare settings - sixth update”, which provides guidance for healthcare facilities and healthcare providers in the EU/EEA and the UK regarding preparedness and infection prevention and control measures for the management of COVID-19 cases in healthcare settings [25]. The CDC updated the guideline, “Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID-19) Pandemic”, which states the recommendation for infection prevention and control (IPC) practices for regular healthcare delivery during the COVID-19 outbreak and the recommendation for IPC practices in caring for a patient with suspected or confirmed infection to this disease [26]. On the other hand, essential workers in agriculture and food-related industries are often not visible to people due to several complex factors [22].

### 1.3. Food Workers under the COVID-19 pandemic

Food workers have been considered essential workers in the midst of the COVID-19 pandemic [19, 21, 22, 27]. According to the FAO, strengthening of food production and distribution systems is key to combat hunger and involves helping tackle disease [28]. The Joint Statement on COVID-19 Impacts on Food Security and Nutrition by FAO, International Fund for Agricultural Development (IFAD), United Nations World Food Programme (WFP), and the World Bank states “The pandemic is already affecting the entire food system”, and also states that “Agriculture and its food-related logistic services should be considered as essential” [29]. In the U.S., the Food and Agriculture Sector is critical to maintain and secure the supply of foods, as reported by the California State [30]. Also, the Food and Agriculture Sector is identified by the CISA as one of 16 critical infrastructure sectors during COVID-19 that are vital for the U.S. [19]. In Canada, the food sector is one of the critical infrastructures during the COVID-19 pandemic [21]. In the UK, food workers, such as persons engaged in food production, processing, distribution, sale, and delivery, are essential (critical) workers under the COVID-19 outbreak [31-33], or sectors for food production and distribution are listed as prioritized sectors during COVID-19 pandemic [34, 35].

Essential workers in critical food production industries have provided foods to people while risking their health [22], as shown in cases of COVID-19 among food workers that were confirmed in several countries/regions [36]. In the EU/EEA countries and the UK, the ECDC reported that 1376 clusters of COVID-19 were confirmed in occupational settings of fifteen EU/EEA countries and the UK between March and early July 2020 [37]. Although the majority of the occupational clusters occurred in the health sector, a large number of clusters were also confirmed from the food

packaging and processing sectors, in factories and manufacturing, and in-office settings [37]. According to the technical report issued by the ECDC, in the food production sector which includes two main categories, food processing, and agricultural food production, a total of 153 clusters and 3856 cases were reported from fourteen countries between March and July 2020 [38]. In Spain, an outbreak was defined as three or more cases with active SARS-CoV-2 infection and reported [39]. During the early summer of 2020, 31 outbreaks were identified related to workers in the fruit and vegetable sector, and at least 12 outbreaks were identified for workers at slaughterhouses or meat processing plants in Spain [39].

COVID-19 cases were also confirmed among food workers in the U.S. [36, 40, 41]. In the U.S., 8,978 cases were reported among workers in 742 food and agriculture workplaces in 30 states, during March to May in 2020 [41]. Among workers in 382 meat and poultry processing facilities in 31 states, 28,364 cases were confirmed during this period [41].

The workplaces for essential food workers have factors that affect food workers' risk for COVID-19 [38, 42-44]. The ECDC issued a technical report that described COVID-19 clusters and outbreaks in occupational settings, including the food packaging and processing setting, in the EU/EEA and the UK [37, 38]. In the technical report, possible factors for transmission of this disease were reported [37, 38]. In addition, the CDC in the U.S. showed documents that explained health and safety steps for specific occupations [45]. The ECDC report mentions the possible factors contributing to COVID-19 clusters in food production workplaces include close and confined spaces without appropriate social distancing, sharing overcrowded accommodations with insufficient hygiene conditions, sharing transportation, and employing seasonal workers from

higher COVID-19 incidence areas [38]. The U.S. CDC states in the interim guidance for agriculture workers and employers from the CDC and the U.S. Department of Labor that farmworkers often have close and prolonged contacts with coworkers in their workplaces, during transportation, and in some housing [42]. The guidance also mentions other factors that may increase the COVID-19 risk, such as contact with contaminated surfaces or objects, sharing transportation, sharing living quarters, living in crowded housing, poor access to clean water through the day, contact within families and with fellow workers in areas where are ongoing community transmission, and mobility of migrant workers who move from farm to farm [42]. The interim guidance for meat and poultry processors from the CDC and the Occupational Safety and Health Administration (OSHA) explains the risk factors in meat and poultry processing workplaces, including close and prolonged contacts to each other on processing lines, contacts with contaminated surfaces or objects, sharing transportation, and frequent contact with coworkers in areas where are ongoing community transmission [43]. The interim guidance for seafood processing workers from the CDC and the OSHA describes risk factors in seafood processing worksites [44]. The possible factors include prolonged closeness to coworkers in seafood processing areas such as cutting, mixing, packing, or quality control areas, close contacts among the workers in shared areas such as shared living spaces and shared transportation, contact with contaminated surfaces or objects [44]. The interim guidance for seafood workers mentions that communal housing onboard vessels for seasonal seafood workers may also increase the risk of getting COVID-19 [44].

Nevertheless, essential workers in agriculture and food-related industries did not receive the same level of support and protection that have been provided to people in other industries such as

healthcare workers [22]. For example, in the U.S., healthcare professionals tacitly recognize the reasonable risks in their professions when a public emergency occurs, and actions to support and protect healthcare workers during the pandemic were quickly conducted by employers and the governments [22]. In contrast, unlike healthcare workers, meat processing workers had not recognized they would continue working and had increased risk for COVID-19 risk through their jobs [22]. For example, many COVID-19 cases were reported among meat and poultry processing workers in the U.S. as well as in Europe [36]. However, in the U.S., official guidance to protect workers in agriculture and food-related industries was issued after many COVID-19 outbreaks in meat processing facilities had been reported [22].

Therefore, in the context of this COVID-19 pandemic, summarizing guidelines/recommendations globally is important for employers or management to understand the COVID-19 risks at workplaces, including guidelines/recommendations from other countries, so as to protect their produce workers from COVID-19.

#### **1.4. Need Statement**

It is necessary to comprehend what global guidelines and/or recommendations have been issued regarding protection of food workers and their contents, in order for public health interventions and/or research by public health experts or researchers.

#### **1.5. Goal Statement and Significance**

The goal of this project is to summarize guidance, guidelines or recommendations, in English or Japanese-speaking regions/countries, to prevent food workers from acquiring COVID-19. The

target regions are limited to English basis regions/countries considering potential issues in accuracy of translation of regulatory documents.

Deliverables of this project would be helpful for public health experts and researchers to understand the regulatory documents and apply them to interventions and research relating to food workers under the COVID-19 pandemic. For example, there might be standard practices or different practices among the regions or countries to prevent COVID-19 transmission. Therefore, comprehending similarities and differences in guidance documents among the target regions or countries for interventions or research would be helpful for public health experts or researchers to plan for their interventions or research in the pandemic. Furthermore, this thesis can trigger further studies, such as the evidence behind the country's guidance, which can be helpful in future interventions or research by public health experts or researchers. Finally, since the COVID-19 situations have been changing rapidly, the information obtained from this study might be updated. However, the guidance information and activities of the regions and countries to protect food workers during the COVID-19 pandemic might be helpful for future interventions or research in response to other epidemics or pandemics.



## Chapter 2. Methods

The identification and selection for guidance documents or guidelines regarding the protection of food workers from COVID-19 followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines [46] with modifications as described below. The details of the strategy for each step are provided in Appendix B.

### 2.1. Identification

#### *Identification of the Specialized Agencies of the United Nations*

The World Health Organization (WHO) and Food and Agriculture Organization of the United Nations (FAO) were selected from the Specialized Agencies of the United Nations.

#### *Identification of target regions, and institutions*

The target regions were selected based on the WHO categorization, in which the WHO Member States are categorized into six regions [47]. Then, I selected the regional institutions of the WHO, the health institutions or their safety and labor institutions for each region.

#### *Identification of target countries, and institutions*

For our analysis, we focused on guidance documents and guidelines written in English or Japanese to avoid translation. Thus, to effectively search guidance documents and guidelines for the food industry which contains details written in English or Japanese, we selected target countries from countries where a primary language, a national language, or an official language is English or Japanese using the following criteria.

- (i) Countries where a primary language, a national language, or an official language is English or Japanese
- (ii) One or two countries from each of Asia, Africa, Americas, Europe and Oceania

*Japan (Asia):* Japan was selected as a country where Japanese is a national language.

*The UK (Europe), the US (Americas), Canada (Americas), Australia (Oceania), New Zealand (Oceania), and Ireland (Europe):* The UK government classified 18 countries as majority native English-speaking countries in addition to the UK [48], and defined that citizens of these countries do not need to prove knowledge of English for British citizenship and settling [49]. Thus, from the UK and the 18 countries, we selected the largest countries in real GDP per capita (> \$40,000); Ireland, the U.S., Australia, Canada, the UK, Malta, and New Zealand [50]. Since the UK, Ireland, and Malta are European countries, Malta, the third country, was excluded.

*South Africa (Africa):* Since African countries were not included in the majority native English-speaking countries classified by the UK government [48, 49], we selected an African country separately. Within the top ten most populous countries in Africa [51], South Africa was the largest country regarding real GDP per capita and used English as one of the official languages [50]. Thus, we selected South Africa from African countries as a target country.

For each country, the websites of the governments, health institutions, or safety and labor institutions were chosen as the data sources for searching the guidance documents or guidelines. For the U.S., in order to focus on information relating to food workers, the U.S. Food and Drug Administration (FDA) and the U.S. Department of Agriculture (USDA) were selected to identify guidance documents or guidelines. The U.S. Department of Labor (DOL) and the Occupational

Safety and Health Administration (OHSA) were not considered for searching because of the lack of focus on food workers. The regions, countries and institutions identified for searching were shown in Appendix C.

### ***Search strategy***

In order to identify relevant documents, we used two methods for the search:

- (i) Search of the Google database;
- (ii) Search within the official websites for the governments, health institutions, or safety and labor institutions.

#### ***(i) Search of the Google database;***

The searches using the Google database were conducted using the search strings that I built.

Strings for searching: occupation\* food worker health (guidance OR guideline) "COVID-19" "workplace" -child\* site: (address of the site)

To obtain information from reliable sources, we specified a site address for each google search. In the "site: " of the strings, the address of the official website of the target institutions was used. When I used the same strings, the number of results or the fields of results were significantly different for several countries or institutions due to the difference in wordings, definitions, volumes of information, and other factors. In such cases, we adjusted the search strings depending on countries and institutions. In addition, if there were no search results, or if there were more than 50 search results, additional searches were conducted using adjusted search strings (Appendix B).

***(ii) Search within the official websites for the governments, health institutions, or safety and labor institutions.***

The searches of the official websites began from the COVID-19 related pages of the sites in many cases, and then several searches were used depending on each official site (Appendix B). For the institutions of Japan, both the sites written in Japanese and written in English sites were searched. Table 1 provided the regions, countries, and institutions identified for the data search and the number of documents identified from the searches.

## **2.2. Screening.**

The screening of the identified documents was performed in two steps. The first screenings of search results were conducted using the inclusion criteria and the exclusion criteria for the first screening.

***Inclusion Criteria for the first screening:***

- (i) Information from reliable sources, such as official websites for governments, health institutions, or safety and labor institutions for the target areas, or information from academic articles;
- (ii) Information relating to COVID-19;
- (iii) Information relating to the protection of food workers from COVID-19. This criterion included the information specific for food workers and the general information for workers, including food workers. This criterion did not include information specific to food workers other than food production workers. For example, information specific to workers in food distributions and food retails was not included;

- (iv) Guideline or guidance. This criterion included the information whose contents were guidance even if it was not clearly defined as a guideline or guidance;
- (v) Information or academic articles issued since 2020;
- (vi) Information that was written in English or Japanese. This criterion included the information translated to English by the institutions or governments.

***Exclusion Criteria or the first screening:***

- (i) Information that was not written, such as a video source, was excluded;
- (ii) Information in internal documents, such as meeting memos, or draft documents, was excluded. However, draft documents that were available to the public, in place of final versions, were not excluded.
- (iii) Summaries of selected guidance documents or guidelines were considered duplicated documents, and excluded.

The second screenings were conducted using the inclusion criteria and the exclusion criteria for the second screening. The inclusion criteria for the second screening were the same as the inclusion criteria for the first screening other than (iii), above. The exclusion criteria for the second screening was the same as the exclusion criteria for the first screening. In the second screening, several documents were excluded by applying the criteria for the first screening more strictly. The details of the screening strategy were provided in Appendix B.

***Inclusion Criteria for the second screening:***

- (i) Information from reliable sources, such as official websites for governments, health institutions, or safety and labor institutions for the target areas, or information from academic articles;
- (ii) Information relating to COVID-19;
- (iii) Information mainly relating to the protection of food workers from COVID-19. This included the information specific to food workers. The information that was not specific to food workers were excluded. In addition, the information that were specific to food workers other than food production workers were excluded. For example, information specific to workers in food distributions and food retails was not included.
- (iv) Guideline or guidance. This criterion included the information whose contents were guidance even if it was not clearly defined as a guideline or guidance;
- (v) Information or academic articles issued since 2020;
- (vi) Information that was written in English or Japanese. This criterion included the information translated to English by the institutions or governments.

***Exclusion Criteria for the second screening:***

- (i) Information that was not written, such as a video source, was excluded;
- (ii) Information in internal documents, such as meeting memos, or draft documents, was excluded. However, draft documents that were available to the public, in place of final versions, were not excluded;

- (iii) Summaries of selected guidance documents or guidelines were considered duplicated documents, and excluded.

### **2.3. Data Extraction**

Information on the selected documents was reviewed and extracted. First, the descriptive information of the documents, including regions, countries, and institutions that issued the documents, title, date of issue or update, type, and target industries, were extracted. Then, I extracted information regarding practices to prevent workers in food-producing industries from acquiring COVID-19;

- (i) Control at the workplace, including at shared housing and shared transportation,
- (ii) Hygiene control including hand-washing, face-coverings, and PPE;
- (iii) Managing workers, including screening, managing when suspected positive cases arise, and education.

Furthermore, I divided the data for each category into several sub-categories. Finally, the review for data extraction was conducted during a period from four days to nine weeks after the data extraction.

### **2.4. Data Analysis**

I conducted data analysis using the data extracted from the selected documents. First, I analyzed the types and targeted industries of the documents among the regions and countries by comparing the number of documents in each type and each industry. Then, I summarized the main features

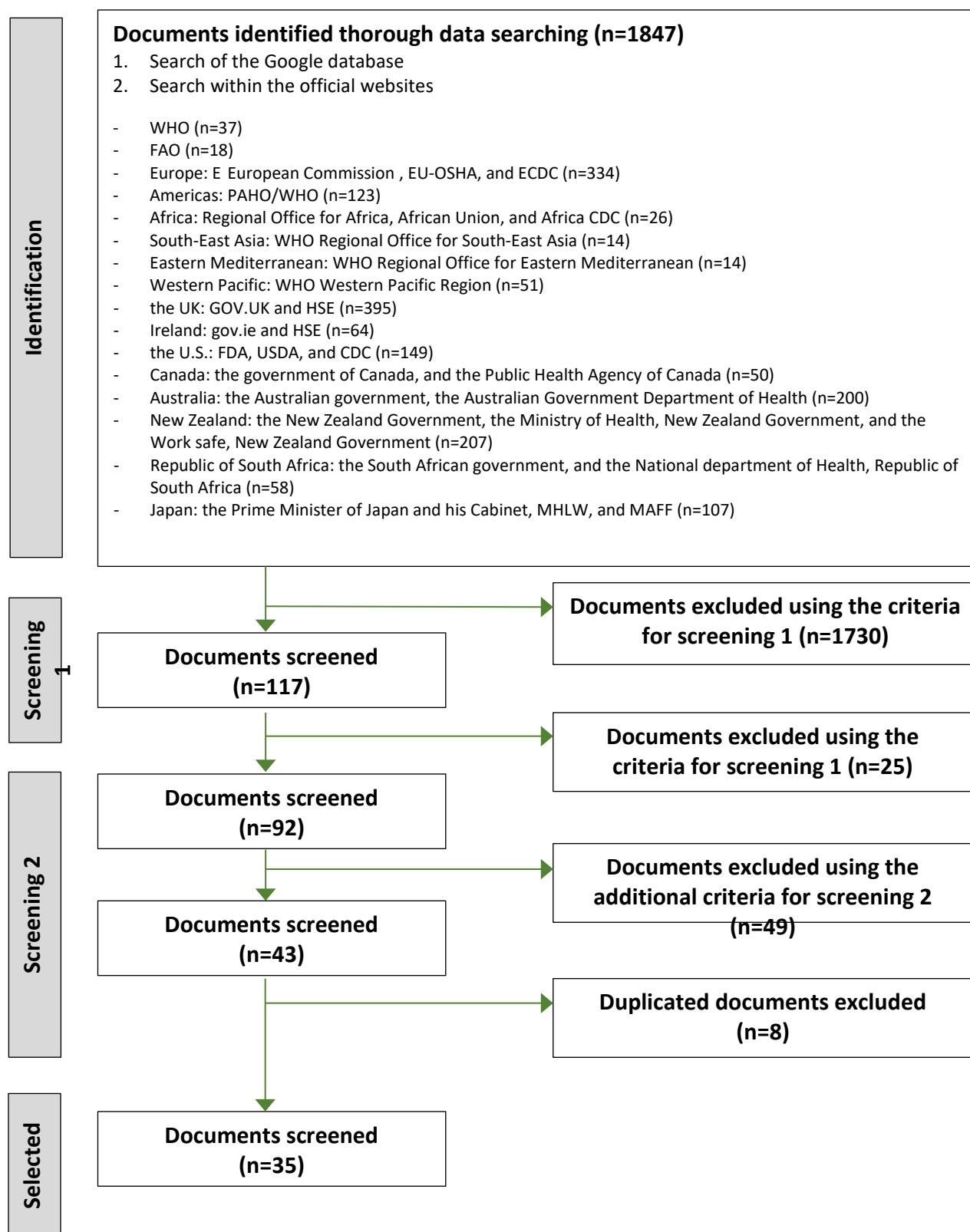
in each category and sub-category and analyzed them by comparing the features, such as similarity and difference among the regions and countries.



### Chapter 3. Results

I identified a total of 1,847 documents through initial data searching and selected 35 documents for review after the screenings (Fig.1, Table 1) [38, 42-44, 52-82] The Specialized Agencies of the United Nations, the regions, or the countries of the selected documents were the WHO (n=3), the FAO (n=1), Europe (n=1), the UK (n=3), the U.S. (n=9), Canada (n=3), Australia (n=4), New Zealand (n=6), and Japan (n=5), as shown in Table 1.

The characteristics of the selected documents are shown in Table 2, and the summary of information extracted regarding practices to prevent workers in food industries from acquiring COVID-19 are provided in Table 3, Table 4, and Table 5.



**Fig.1** Flow diagram depicting searching and screening process of documents

**Table 1. Regions, Countries, and Institutions identified for data search**

Regions, Countries, and institutions identified for data search		Identified documents	Selected documents	
			(n)	(%)
<b>Specialized agencies of the United Nations</b>				
<b>World Health Organization (WHO)</b>		37	3	9
<b>Food and Agriculture Organization of the United Nations (FAO)</b>		18	1	3
<b>Regions</b>				
<b>Europe</b>	WHO Regional Office for Europe European Commission the European Union information agency for occupational safety and health (EU-OSHA) European Centre for Disease Prevention and Control (ECDC)	334	1	3
<b>Americas</b>	Pan American Health Organization, Regional Office for the Americas of the World Health Organization (PAHO/WHO)	123	0	0
<b>Africa</b>	World Health Organization, Regional Office for Africa African Union Africa Centres for Disease Control and Prevention	26	0	0
<b>South-East Asia</b>	World Health Organization, Regional Office for South-East Asia	14	0	0
<b>Eastern Mediterranean</b>	World Health Organization, Regional Office for Eastern Mediterranean	14	0	0
<b>Western Pacific</b>	World Health Organization Western Pacific Region	51	0	0
<b>Countries</b>				
<b>the UK</b>	the website of government of UK (GOV.UK) <sup>a</sup> Health and Safety Executive (HSE)	395	3	9
<b>Ireland</b>	the website of government of Ireland (gov.ie) Health Service Executive (HSE)	64	0	0
<b>the U.S.</b>	the U.S. Food and Drug Administration (FDA) the U.S. Department of Agriculture (USDA) Center for Disease Control and Prevention (CDC)	149	9	26
<b>Canada</b>	Government of Canada <sup>b</sup> Public Health Agency of Canada	50	3	9
<b>Australia</b>	Australian government <sup>c</sup> Australian Government Department of Health	200	4	11
<b>New Zealand</b>	New Zealand government <sup>d</sup> Ministry of Health, New Zealand government WorkSafe, New Zealand government	207	6	17
<b>Republic of South Africa</b>	South African government National Department of Health, Republic of South Africa	58	0	0
<b>Japan</b>	Prime Minister of Japan and his Cabinet Ministry of Health, Labour and Welfare (MHLW) Ministry of Agriculture, Forestry and Fisheries (MAFF)	107	5	14
<b>Total</b>		1847	35	100

<sup>a</sup> Documents issued by the Department for Environment, Food & Rural Affairs are included.

<sup>b</sup> Documents issued by the Agriculture and Agri-Food Canada (AAFC) or the Canadian Food Inspection Agency (CFIA) are included.

<sup>c</sup> Documents issued by the Safe Work Australia (SWA) are included.

<sup>d</sup> Documents issued by the Ministry of Primary Industry (MPI) are included.

### **3.1. Characteristics of the Selected Documents**

The characteristics of the selected documents, including regions and countries, institutions that issued the documents, titles, dates of issue or update, types, and target industries, are provided in Appendix C. To understand the characteristics of the documents, I analyzed the types and target industries of the documents (Table 2). As provided in Table 2, around half of the documents were guidelines or guidance documents, and the rests were other forms such as information, advice, recommendation, summary, a bulletin, fact sheets, Question & Answers, checklists, and a technical report [38, 42-44, 52-82]. Thirteen documents were for the food industry, and others were for more specific categories in the food industry, including the food and agriculture industry, agriculture, the meat and meat processing industry, the seafood industry, the meat and seafood processing industry, and others [38, 42-44, 52-82].

**Table 2. Type and target industry of the selected documents**

Type and Industry	Number of documents (n=35)	Number of Regions (n=3) <sup>a</sup>	Number of Countries (n=6) <sup>b</sup>	Example	Reference		
<b>Type of documents</b>							
Guidance/Guideline <sup>c</sup>	17	2	WHO <sup>d</sup> , FAO <sup>d</sup>	5	UK, U.S, Canada, New Zealand, Japan	Guidance, interim guidance, guideline, basic guideline	[42-44, 52, 53, 56-58, 65, 73, 75, 78-82]
Information <sup>e</sup>	13	1	FAO	4	U.S., Canada, Australia, New Zealand	Information, information and advice, recommendation, summary of key steps, bulletin, recommendation, summary, fact sheet	[55, 60-63, 67-72, 74, 77]
Questions and Answers	2	1	WHO,	1	U.S.	Questions and answer	[54, 64]
Check list	2	0		2	U.S., Canada	Checklist	[59, 66]
Technical report	1	1	Europe	0		Technical report	[38]
<b>Industry targeted in the documents</b>							
Food industry <sup>f</sup>	13	2	WHO <sup>d</sup> , FAO <sup>d</sup>	5	UK, U.S., Australia, New Zealand, Japan	Food industry, the manufacturing, processing, warehousing, picking, packaging, retailing and service of food, food or food packaging, food processing & manufacturing	[52-55, 57-59, 70-72, 74, 78, 79]
Food and Agriculture	4	0		1	U.S.	the food and agriculture industry	[60-63]
Agriculture	9	0		5	UK, U.S., Canada, Australia, Japan	the agricultural industry, seasonal agricultural work, agriculture and agri-food sector, livestock business	[42, 56, 64-66, 68, 69, 80, 81]
Meat and meat processing industry	2	0		2	U.S., Canada	Meat and meat processing industry, meat slaughter and processing	[43, 67]
Sea foods industry	3	0		3	U.S., New Zealand, Japan	Seafood processing, fishers, fishers including crew	[44, 77, 82]
Meat and seafood processing industry	1	0		1	New Zealand	Red meat and poultry primary and secondary processing, and seafood processing	[76]
Others	3	1	Europe <sup>g</sup>	1	New Zealand	Occupational settings, Primary industry and food businesses	[38, 73, 75]

a the Specialized agencies of the United Nations for the selected documents: WHO and FAO, the region for the selected documents: Europe

b the countries for the selected documents: the UK, the U.S., Canada, Australia, New Zealand, and Japan

c Included guidance, interim guidance, guideline, basic guideline and information about a basic guideline

d Two guidelines were issued by the WHO and the FAO

e Included information, summary of information, recommendation, advice, bulletin, and fact sheets

f Not separated into each category in the food industry or include multiple categories in the food industry

g The target region is the EU/EEA and the UK.

### 3.2. Control at the Workplace, including at Shared Housing and Transportation

In the practices to prevent food workers from acquiring COVID-19, control at the workplace seems essential. Thus, to analyze the workplace controls among the regions and the countries, I extracted information from the selected documents regarding the control at workplaces and analyzed the extracted information. I selected and extracted nine categories of practices; i) At least a 6 feet distance between people at the workplace, ii) Addition or adjusting places to maintain a distance at the workplace, iii) Adjusting times or the number of workers to reduce crowding at the workplace, v) Ventilation in workplaces, iv) Physical barriers among workers if the distancing is not available, vi) Consideration of cohorting workers, vii) Consideration on shared housing, viii) Consideration on shared transportation, and ix) Consideration of the mobility of workers (Table 3).

As shown in Table 3, regarding physical distancing, all of the regions and the countries described a distancing that should be maintained between workers or people as a practice to reduce the spread of COVID-19, or a risk factor [38, 42-44, 53-55, 57, 59, 64-66, 68-73, 75-82]. However, the distance is slightly different among the regions and countries; for example, at least 1 meter, by the WHO & the FAO [53-55]; 2 meters and considering 1 meter with further mitigation 2 meters cannot be implemented, by the UK [57]; 2 meters or at least 2 meters (6 feet), by Canada and the U.S. [42-44, 64-66]; 2 meters as a guide and at least 1 meter by Japan [78-82], and at least 1.5 meters by Australia [68-71]. In New Zealand, physical distancing is described in detail at alert level 3: 2 meters or more if reasonably achievable, between 1 and 2 meters if unavoidable, and less than 1 meter in specified situations [75, 76]. In addition, most of the regions and countries suggested practices to achieve the defined distancing and to reduce crowding, such as adjusting

workstations or workflows, staggering work shifts or times, and reducing the number of workers at workplaces [38, 42-44, 53-55, 57-59, 64-66, 69, 71, 72, 75-77, 79-81]. Also, grouping workers to reduce the exposure of individuals to others were suggested in most regions and countries [42-44, 53-55, 57-59, 65, 66, 68, 69, 73, 75, 76, 81]. In addition, most regions and countries briefly described ventilation in workplaces [42-44, 53, 54, 57, 59, 62, 66, 69, 71, 73, 75, 76, 79-82]. Furthermore, in the UK, the U.S., Canada, and Australia, considerations on shared housing and transportation were explained [42-44, 57, 59, 65, 66, 69-71], and in the EU/EEA and the UK, shared housing and transportation were mentioned as potential risk factors [38]. In conclusion, the information extracted shows; (i) most of the regions and countries suggested a certain distancing to be maintained, including ways to achieve distancing and reduce crowding, (ii) most regions and countries briefly described ventilation in workplaces, and (iii) some, but not all regions and countries, had specific guidance identified on the risks and practices regarding shared accommodation and transportation.

**Table 3. Control of workplace, shared housing and shared transportation in food producing industries**

Control	Number of Regions (n=3) <sup>a</sup>	Number of Countries (n=6) <sup>b</sup>	Summary		
At least a 6 feet distance between people at workplace	3	WHO, FAO, Europe <sup>c, d</sup>	6	UK, U.S., Canada, Australia, New Zealand, Japan	All of the regions and countries that issued the selected documents described distancing that should be maintained between workers or people as a practice to reduce the spread of COVID-19, or a risk factor [38, 42-44, 53-55, 57, 59, 64-66, 68-73, 75-82]. However, the distance was slightly different among the regions and countries; for example, at least 1 meter by the WHO & the FAO [53-55]; 2 meters and considering 1 meter with further mitigation 2 meters cannot be implemented by the UK [57]; 2 meters or at least 2 meters (6 feet) by the U.S. and Canada [42-44, 64-66]; 2 meters as a guide and at least 1 meter by Japan, and at least 1.5 meters by Australia [68-71, 73]. In New Zealand, physical distancing for alert level 3 is described in detail; 2 meters or more if reasonably achievable, between 1 and 2 meters if unavoidable, and less than 1 meter in specified situations [75, 76].
Addition or adjusting places to maintain physical distancing at workplace	2	WHO, FAO	6	U.S., Canada, Australia, New Zealand, Japan	Most of the regions and countries suggested modifying workstations or workflow as steps to maintain defined distancing between workers [38, 42-44, 53-55, 58, 59, 65, 66, 69, 71, 75, 76]. For example, the WHO & the FAO suggested staggering workstations so that workers not to facing each other by [53-55], the U.S. (for meat and poultry workers) [43] and Canada [65, 66] described modifying the alignment so that workers are at a minimum of six feet or 2 meters apart in all directions. New Zealand explained that creating walkways to pass “side-by-side” or “back-to-back” is suggested for alert level 3 [75, 76].
Adjusting times or the number of workers to reduce crowding at workplace	2	WHO, FAO	6	UK, U.S., Canada, Australia, New Zealand, Japan	In most cases, adjusting times and limiting the number of workers are suggested to reduce crowding at workplace [42-44, 53, 54, 57, 59, 64-66, 69, 71, 72, 75-77, 79-81]; for example, staggering shift times/work times (U.S., Canada) [42-44, 57, 59, 65, 66]; staggering break times (U.S., Canada) [42, 59, 65, 66]; limiting or reducing the number of workers (WHO, FAO, UK, Australia) [53, 54, 57, 69, 71]; reducing crew size (U.S.) [42]; splitting workers into more than one shift (U.S.) [43, 44].
Physical barriers among workers if physical distancing is not possible	0		5	UK, U.S., Canada, Australia, New Zealand (at level 3)	In several countries, physical barriers were recommended if the defined distancing is not possible [42-44, 57, 59, 64-66, 71, 75, 76]; for example, physical barriers (UK) [57], physical barriers, shields, or divider or partitions (U.S.) [42-44], shields or physical barriers (Canada) [65, 66], physical barriers such as partitions [71], physical intact screens (New Zealand, at alert level 3) [75, 76].
Consideration of cohorting workers	2	WHO, FAO	6	UK, U.S., Canada, Australia, New Zealand, Japan	Most of the regions and countries suggested grouping workers into cohorts to reduce the exposure of individuals to others [42-44, 53-55, 57-59, 65, 66, 68, 69, 73, 75, 76, 81]. In several countries, cohorts are extended to outside of workplaces if necessary; for example, cohorts travel together if relevant (UK) [57], were extended to transportation and communal housing if possible (U.S.) [44], or live, commute and/or work together (Canada) [65]. In New Zealand, workplace teams were called workplace “bubble” [73, 75, 76].



**Table 3. (Continued)**

<b>Control</b>	<b>Number of Regions (n=3)<sup>a</sup></b>	<b>Number of Countries (n=6)<sup>b</sup></b>	<b>Summary</b>
Ventilation at work places	2 WHO, FAO	UK, U.S., Canada, Australia, New Zealand, Japan	In most regions and countries, ventilation in work places were described [42-44, 53, 54, 57, 59, 62, 66, 69, 71, 73, 75, 76, 79-82]. For example, the WHO and the FAO suggested ventilation in a room when staff are unwell in the workplace [53, 54]. In other countries, increasing air flow was explained as regular practices .if possible [43, 44, 57, 59, 66, 73, 75, 76, 79-82]. In addition, several countries explained good air flow in share housing (U.S., Canada) [42, 44, 66].
Consideration on shared housing	1 Europe <sup>c, d</sup>	4 UK, U.S., Canada Australia	Some regions and countries described shared housing as risk factors or special considerations [38, 42, 44, 57, 59, 65, 66, 68, 69]. For example, sharing accommodation with crowded and poor hygiene was explained as a possible risk factor (the EU/EEA and the UK) [38], and shared accommodation was not recommended (UK) [57]. Additional measures such as enhanced sanitation and others were explained (U.S., Canada) [42, 66], and separation of workers in quarantine or workers with confirmed or suspected COVID-19 from other workers were described (U.S., Canada) [44, 66].
Consideration on shared transportation	1 Europe <sup>c, d</sup>	4 UK, U.S., Canada Australia	Some regions and countries described shared transportation as risk factors or special considerations [38, 42-44, 57, 59, 65, 66, 68, 69, 71]. Shared transportation (UK) [57]or carpooling (U.S., Canada) [43, 44, 65, 66]were encouraged to be avoided if possible, but if unavoidable, practices, such as minimizing the number of workers, grouping workers and face-coverings, were suggested [42-44, 57, 65].
Consideration of mobility of workers	1 Europe <sup>c, d</sup>	1 U.S.	In a few regions and countries, considerations on the mobility of workers were described [38, 42]. Employing seasonal workers from higher incidence areas was reported as possible risk factors (the EU/EEA and the UK) [38], mobility of migrant workers was described as the factors affecting farmworker's risk (U.S.) [42].

a The Specialized agencies of the United Nations for the selected documents: the WHO and the FAO, the region for the selected documents: Europe

b The countries for the selected documents: the UK, the U.S., Canada, Australia, New Zealand, and Japan

c The EU/EEA and the UK are the target regions of the document [38]

d Described as possible factors to COVID-19 clusters in food production settings, including agriculture. Recommendations are not described.

### 3.3. Hygiene Control, Face Coverings and PPE

In addition to general circumstances, also at the workplace, hygiene control, face coverings, and/or PPE were seen as important as prevention controls against COVID-19. Therefore, to analyze hygiene control at the workplace among the regions and the countries, including face coverings and PPE, I extracted the following information and analyzed them; i) Hand hygiene- hand-washing with soap, ii) Hand hygiene- sanitizing with hand-sanitizer, iii) Cleaning and Sanitation of workplace, iv) Cleaning and Sanitizing tools and equipment, v) Face masks or face coverings, vi) PPE (Table 4).

As shown in Table 4, most of the regions and countries described hand-washing and sanitizing of hands [42-44, 53-55, 57-59, 65, 66, 68-76, 78-82]. Among these regions and countries, several countries also included the usage of hand-sanitizer, as an alternative practice of hand-washing [42, 43, 58, 65, 66, 68-71]. Furthermore, most of the regions and countries explained practices about cleaning and sanitation of the workplace [42-44, 52-55, 57-59, 62, 64-66, 68-71, 73, 75, 76, 78-82]. In addition, in several countries, cleaning or disinfecting of shared equipment or working tools were described [42-44, 65, 66, 68-71, 74, 80]. Also, most of the regions and countries suggested the use of face masks or face coverings, however, the practices were slightly different among the regions and countries, and closely related to physical distancing in many cases [42-44, 52-55, 57, 62, 64, 65, 68-71, 73-76, 78-82]. For example, in the U.S., Canada, New Zealand, and Japan, face coverings were recommended or required under the defined conditions [42-44, 65, 73, 75, 76, 79, 81, 82]. In the UK, face coverings were recommended in some food workplaces when a 2-meters distancing or a 1-meter distancing with further mitigation measures is not feasible [57]. In Australia, wearing face masks can be directed by employers if the necessity is decided in

consultation with workers [71]. Regarding PPE, most of the regions and countries described PPE [42-44, 52, 53, 57, 58, 65, 66, 69, 71, 73, 75, 76] In several countries, the necessity of PPE was evaluated by hazard assessments or case-by-case [42-44, 57, 58, 65, 66, 69, 71, 73, 75, 76]. To sum up, the results show that most of the regions and countries described hand hygiene, cleaning and sanitation of the workplaces, and face coverings as preventive controls. Also, the information extracted shows the details of practices regarding face-coverings were different among the regions and countries, and they depended on possible distance in many cases.

**Table 4. Hygiene control, face coverings and PPE in food producing industries**

Control and PPEs	Number of Regions (n=3) <sup>a</sup>	Number of Countries (n=6) <sup>b</sup>	Summary		
Hand hygiene- hand washing with soap	2	WHO, FAO	6	UK, U.S., Canada, Australia, New Zealand, Japan <sup>c</sup>	Most of the regions and countries the issued the selected documents mentioned hand washing [42-44, 52-55, 57-59, 61, 62, 65-82], and most cases suggested hand washing with soap for at least 20 seconds [42, 44, 53, 55, 61, 65, 66, 68-71, 73, 75, 76].
Hand hygiene- sanitizing with hand-sanitizer	2	WHO, FAO	6	UK, U.S., Canada, Australia, New Zealand, Japan	Most of the regions and countries mentioned to sanitizing of hands [42-44, 53-55, 57-59, 65, 66, 68-76, 78-82], and among them several countries suggested using hand-sanitizer as alternative practice of hand washing with soap (U.S.) [42, 43], (UK) [58], (Canada) [65], and (Australia) [68-71].
Cleaning and Sanitation of workplace <sup>d</sup>	2	WHO, FAO	6	UK, U.S., Canada, Australia, New Zealand, Japan	Most of the regions and countries suggested cleaning, sanitation or disinfection of workplace or common areas [42-44, 52-55, 57-59, 62, 64-66, 68-71, 73, 75, 76, 78-82]. Especially, for high-touch areas and surfaces, regular or frequent cleaning, disinfection or sanitizing were suggested (UK) [58], (U.S.) [42, 43], (Australia) [68-71], (New Zealand, Level 2 and 3) [73] [75, 76], (Japan) [78-82].
Cleaning and Sanitizing of tools and equipment <sup>d</sup>	0		5	U.S., Canada, Australia, New Zealand Japan	Cleaning or disinfecting of share equipment or working tools were explained in several countries (U.S., Canada, Australia, New Zealand, and Japan) [42-44, 65, 66, 68-71, 74, 80]. For example, cleaning and disinfecting of tools between each worker's use, when changing workstations, or when moving to new tools were suggested (U.S., Canada) [42-44, 65].
Face masks or face coverings	2	WHO, FAO	6	UK, U.S., Canada, Australia, New Zealand, Japan	Most of the regions and countries suggested the use of face masks or face coverings, however, the practices were slightly different and closely related to distancing in many cases [42-44, 52-55, 57, 62, 64, 65, 68-71, 73-76, 78-82]. In the U.S., Canada, New Zealand, and Japan, face coverings were recommended or required under the defined conditions; the U.S.: wearing cloth face coverings was recommended in addition to physical distancing in agricultural, seafood, and meat and poultry worksites. Wearing face coverings was especially important when physical distancing was difficult [42-44]; Canada: as requirements since pre-COVID-19, when in agricultural and food facilities [65]; New Zealand at Alert level2: when 1-2 meters of distance in enclosed buildings or 1meter distancing outside [73]; New Zealand at Alert level3: when in enclosed buildings or when 2-meter distancing is not maintained [75, 76], Japan: wearing masks and maintaining a 2 meters distance (at least 1 meter) as a guide [79, 81, 82]. In the UK, face coverings were recommended in some areas of food workplaces when a 2-meters distancing or a 1-meter distancing with further mitigation measures is not feasible [57]. In Australia, wearing face masks could be directed by employers if the necessity was decided in consultation with workers [71].

**Table 4. (Continued.)**

<b>Control and PPEs</b>	<b>Number of Regions (n=3)<sup>a</sup></b>	<b>Number of Countries (n=6)<sup>b</sup></b>	<b>Summary</b>
PPE	2 WHO, FAO	5 UK, U.S., Canada, Australia, New Zealand	Most of the regions and countries described PPE [42-44, 52, 53, 57, 58, 65, 66, 69, 71, 73, 75, 76]. In several countries, the necessity of PPE was evaluated by hazard assessments or case-by-case [42-44, 57, 58, 65, 66, 69, 71, 73, 75, 76]. For example, hazard assessments are conducted in the U.S. to consider the necessity of PPE [42-44]. In Canada, hazard assessments to consider the necessity of PPE are conducted when a 2 meters-distancing or a 1-metre distancing with further mitigation measures is not achievable [66]. In the UK, PPE or face coverings are recommended in some areas of food workplaces when 2 meters of distancing is not feasible [57]. In Australia, PPE depends on workplaces, however, PPE will not be required for many workplaces [69, 71], and in New Zealand, protective clothing in processing area is necessary, but in other areas is considered by case-by-case [73, 75, 76].

a The Specialized Agencies of the United Nations for the selected documents: the WHO and the FAO, the region for the selected documents: Europe

b The countries for the selected documents: the UK, the U.S., Canada, Australia, New Zealand, and Japan

c Soap is not mentioned in the selected Japanese guidelines

d Practices for COVID-19 positive cases are not included.

### 3.4. Screening, Managing and Education of Workers

Screening of workers' conditions and appropriate managing of symptomatic workers is important to prevent the spread of COVID-19 at the workplaces. Also, training of workers about this disease would be critical to prevent the infection with the disease and its spread. Thus, to analyze screening, managing and education of workers among the regions and the countries, I extracted the related information from the selected documents and analyzed the extracted information; i) Checking of workers' conditions before starting work, ii) Managing workers being suspected of having COVID-19 at workplace, and iii) Education of workers regarding COVID-19, or necessity of awareness of the symptoms (Table 5).

First, as provided in Table 5, screening to check workers' conditions at prior to work or at an appropriate timing were suggested, including checking for a fever or the symptoms of COVID-19 in most of the regions and countries [42-44, 52, 59, 65, 66, 68-76, 78-82]. In addition, some countries described considerations for offshore workers [44, 82]. For example, the U.S. described that employers should consider having seafood workers for offshore sites quarantine and self-monitor the symptoms for 14 days before initial entry [44]. Next, most of the regions and countries mentioned the management of COVID-19 infected or symptomatic workers at workplaces [42-44, 52-55, 57, 59, 62, 65, 66, 69, 71-76, 78-82]. In most cases, the documents suggested to separate the workers who have symptoms from other people at workplace as immediate actions [42-44, 53, 54, 57, 65, 69, 71]. Furthermore, most of the regions and countries described education or training of workers regarding COVID-19, or necessity of awareness of the symptom [42-44, 52, 53, 55, 56, 59, 62, 65, 66, 69, 71-76, 82]. For instance, the WHO and the FAO state that workers need to know the symptoms of COVID-19 [52, 53, 55]. The UK suggested the instructions and guidance

that seasonal workers should receive [56]. The U.S. and Canada explained that training should be provided for workers about COVID-19, and that training should be easy to understand with appropriate languages and at the appropriate literacy level [42-44, 66]. To conclude, most of the regions and countries contained the practices regarding screening of workers' conditions, management of symptomatic workers, and training of workers about this disease.

**Table 5. Screening, managing and education of workers in food industries**

Screening, Managing and Education	Number of Regions (n=3) <sup>a</sup>	Number of Countries (n=6) <sup>b</sup>	Examples	
Checking of workers' conditions before starting work	2	WHO, FAO	5 U.S., Canada, Australia, New Zealand, Japan <sup>c</sup>	In most of the regions and countries, screening to check workers' conditions including a fever or the symptoms of COVID-19 at prior to work or at an appropriate timings are described [42-44, 52, 59, 65, 66, 68-76, 78-82]. Before entering the workplace, screening about a fever and symptoms, including checking temperature, is conducted in the U.S. and Canada [42, 43, 65], and workers sign off COVID-19 health status in New Zealand [73, 75, 76]. In Australia, workers are monitored for key COVID-19 symptoms, including a fever [69, 71], and in Japan, workers are requested to measure and record their temperature [78-82]. Also, considerations for offshore workers were described [44, 82]. For example, employers consider having seafood workers for offshore sites quarantine and self-monitor the symptoms for 14 days before initial entry (U.S.) [44], and crew members are requested to measure their temperature and asked about the conditions before the departure (Japan) [82].
Managing workers being suspected of having COVID-19 at workplace	2	WHO, FAO	6 UK, U.S., Canada, Australia, New Zealand, Japan	Most of the regions and countries described managing of COVID-19 infected or symptomatic workers at workplaces [42-44, 52-55, 57, 59, 62, 65, 66, 69, 71-76, 78-82]. For example, as immediate actions, most countries suggested separating the workers who have symptoms at workplace from other people [42-44, 53, 54, 57, 65, 69, 71]. For offshore workers, in addition to separating them from others, it is suggested to discuss the disembarkation of patients with applicable authorities (U.S.) [44]. In New Zealand, reporting to the manager for further instruction were suggested [73, 75, 76], and in Japan, reporting to the manager or liaison is requested [78-82].
Education of workers regarding COVID-19, or necessity of awareness of the symptoms	2	WHO, FAO	6 UK <sup>d</sup> , U.S., Canada, Australia, New Zealand, Japan <sup>e</sup>	Most of the regions and countries described education or training of workers regarding COVID-19, or necessity of awareness of the symptom [42-44, 52, 53, 55, 56, 59, 62, 65, 66, 69, 71-76, 82]. For example, the WHO and the FAO state that workers need to know the symptoms of COVID-19 [52, 53, 55]. The guidance of the UK for seasonal agricultural workers described instructions and guidance that seasonal workers should receive, including about COVID-19 [56]. In the U.S. and Canada, training about COVID-19 such as signs, symptoms, and spreads of COVID-19, risks, protection of workers hand-sanitization, and other routine controls are explained [42-44, 66]. Also, the U.S. and Canada suggested that training should be easy to understand, with appropriate languages and at the appropriate literacy level [42-44, 66]. In Australia, training about hygiene and PPE are described [69, 71], and in New Zealand, instructions about hygiene and masks are mentioned [73, 75, 76].

a The Specialized Agencies of the United Nations for the selected documents: the WHO and the FAO, the region for the selected documents: Europe

b The countries for the selected documents: the UK, the U.S., Canada, Australia, New Zealand, and Japan

c Measurement and recoding of worker's body temperature is requested. The concrete timing is not mentioned in the guidelines.

d Described in the guidance for the UK for seasonal agricultural workers. Instruction, guides and information for seasonal workers when they arrive at the farms

e Described in the guideline for fishers including crews.



## Chapter 4. Discussion and Public Health Implication

The goal of this project was to summarize guidance, guidelines or recommendations to prevent food workers from acquiring COVID-19 in English-speaking regions/countries. From this study, we obtained three main findings. The first main finding was that most of the regions and countries defined a certain physical distancing and suggested in detail how to achieve the distancing and reduce crowding. The second finding was that several countries contained guidance for shared housing and shared transportation. The last one was that most of the guidance documents or guidelines mainly described employers' activities, including managers, qualified coordinators, companies, business owners, or organizations, except for the guidance specific for workers.

### 4.1. Main Findings

#### *Defined physical distancing and the ways to achieve the distancing and reduce crowding*

The first main findings was that most of the regions and countries defined a certain physical distancing and suggested in detail how to achieve the distancing and reduce crowding. These detailed guidelines regarding physical distancing are considered to reflect distinctive risk factors on the spread of COVID-19 in food-producing workplaces.

A close distancing is considered one of the factors for SARS-CoV-2 transmission [83-85]. The WHO described in their policy brief that transmission of SARS-CoV-2 primarily occurs between people being in close contact with an infected person [84]. According to the WHO, there are several possible modes of transmission, including contact and droplet transmission, airborne transmission, fomite transmission, and others [85]. Droplet transmission can occur when a person is in close contact (within 1 meter) with an infected person with respiratory symptoms or talking

or singing [85]. The CDC explained in the scientific brief three principal ways in which exposures to respiratory fluids carrying SARS-CoV-2 occur; “Inhalation of air carrying very small fine droplets and aerosol particles that contain infectious virus,” “Deposition of virus carried in exhaled droplets and particles onto exposed mucous membranes,” and “Touching mucous membranes with hands soiled by exhaled respiratory fluids containing virus or from touching inanimate surfaces contaminated with virus” [83]. According to the CDC, the risk for transmission by inhalation of fine droplets and aerosol is greatest within three to six feet from an infectious source, and virus deposition onto exposed mucous membranes is likewise greatest close to an infectious source [83].

Regarding food workplaces, considering conditions of workplaces and work time-period, close contact is considered one of the possible factors that contributed to risk for COVID-19, as several countries indicated [38, 40, 42-44, 66]. For example, the ECDC reported that confined or close spaces and lack of distancing were possible factors to COVID-19 clusters in food production and agricultural settings [38]. Waltenburg MA, Victoroff T, Rose CE, et al. stated in their report that close workplace contact with workers (within 6 feet for  $\geq 15$  minutes) for long time periods (8–12 hour shifts) was one of the characteristic risk factors for exposure to SARS-CoV-2 in meat and poultry processing settings [40]. Furthermore, the CDC included the distance between workers and duration of contact in distinctive factors that affect workers’ risk for COVID-19 in agriculture, workplaces, meat and poultry processing workplaces, and seafood processing worksites [42-44]. The Agriculture and Agri-Food Canada (AAFC) in Canada also included close contact with an infected individual and distance between employees as factors that are believed to contribute to the transmission of COVID-19 [66].

***Guidance for shared housing and shared transportation:***

The second finding was that several countries contained guidance for shared housing and shared transportation. This guidance for shared housing and shared transportation is also presumed to reflect risk factors of spreading COVID-19 in special settings of the food-producing industry.

Shared accommodations provided people with extended time indoors with close proximity to others and several studies demonstrated outbreaks occurring from shared accommodations [84]. According to the WHO, SARS-CoV-2 transmission occurs in settings, such as indoor, crowded, and inadequately ventilated spaces, where infected people spend long time with others, suggesting the transmission is especially effective in crowded, confined indoor spaces if there is poor or no ventilation [84]. Thus, shared housing and shared transportation can be risk factors. For instance, in the EU/EEA and the UK, the ECDC report listed sharing accommodation among workers, mainly referring to migrant workers, and shared transport as risk factors [38]. In the U.S., the CDC guidance document explained communal housing or sharing transportation as risk factors due to close contact among people and prolonged close contact [42]. A report included shared transportation and congregate housing as distinctive factors for exposure to SARS-CoV-2 for meat and poultry processing workers [40]. The guidance in Canada described that shared spaces such as bunkhouses, break rooms, locker rooms and entrances/exits, and sharing transportation may also contribute to the risk for workers [65].

***Employers' activities:***

In addition, most of the guidance documents or guidelines mainly described employers' activities, including managers, qualified coordinators, companies, business owners, or organizations, except

for the guidance specific for workers. For example, most documents suggested that employers develop control plans, encouraged workers to conduct defined practices, and ensured that workers comply with procedures. This document structure seems to show target readers of these guidance documents or guidelines. For example, the guidance of the UK, "Guidance for food businesses on coronavirus (COVID-19)", defined the role of employers for prevention and management of outbreaks, including conducting a COVID-19 risk assessment at workplaces, preparing a business continuity plan, and conducting regular reviews seeking feedback from staff for improvement [57]. The CDC guidance to protect seafood workers from COVID-19 described that all seafood processing employers need to plan for assessment and control of COVID-19 in workplaces to protect workers' health and ensure workers can continue safely operating [44]. In Canada, "Workplace guidance for agriculture and agri-food sector employers and employees" explained activities that employers can do, such as activities to promote physical distancing, to promote good hygiene, and to focus on increased sanitation and disinfection practices [65].

#### **4.2. Strength and Limitation**

This review has several strengths. The key strength is that we searched documents combining two different kinds of methods; (i) Search of the Google database, and (ii) Search within the official websites for the governments, health institutions, or safety and labor institutions. Each region and country may have different categorizations, definitions, and wordings to describe worker's health in the food-producing industry. Thus, this combination was effective in identifying intended documents in different regions and countries. The second strength is that, in addition to countries, we selected targets for search from the Specialized Agencies of the United Nations such as WHO and FAO, and other regional agencies such as ECDC. Since these agencies cover information

from their member states, I was able to obtain guidance information that covers broad areas, in addition to detailed guidance information from each country. Furthermore, I selected documents whose contents were guidance even if the documents were not defined as guidelines or guidance. This criterion was helpful in supplemental information in addition to guidance or guidelines.

There were some limitations in this study. First, I might have potentially missed English guidance or guidelines issued in English-speaking countries where English is not an official or primary language. I selected target countries from countries where English or Japanese is a primary language or an official language to search English or Japanese documents containing details. Second, we have not extracted all of the information from the selected documents. I extracted information based on the topic we identified because the level of details was significantly different among regions or countries. Furthermore, the dates of issue or updates of the selected documents for food workers ranged from 2020 to 2021. For example, most selected documents were issued or updated in 2020, and some documents, such as the CDC interim guidance documents, were updated in 2021. However, the information regarding COVID-19 has been updating rapidly. Thus, the data that supports each document might be different depending on the timing of issuing or updating.

### **4.3. Implication**

The review results would be helpful for public health experts and researchers who intend to conduct interventions or research of the food-producing industry under the COVID-19 pandemic. For example, among the countries, there were common practices to prevent COVID-19 transmission such as hand washing with soap, but there were several differences including a

defined physical distancing and conditions for face coverings. Thus, to comprehend similarities and differences in guidance among the target countries would be crucial to plan for intervention to the countries. Furthermore, further studies about the evidence behind the country's guidance might be also useful for future interventions or research. Finally, the information and situation regarding COVID-19 has been updating rapidly, including the COVID-19 vaccine. For instance, CDC issued an interim guidance, "Interim Public Health Recommendations for Fully Vaccinated People" [86]. Thus, continued monitoring of the guidance documents or guidelines among countries would be helpful to understand the impact of the vaccination on practices to prevent COVID-19 from food workers and food producing workplaces.

#### **4.4. Conclusion**

This review has shown the main components to protect food workers from acquiring COVID-19 in the guidance documents or guidelines of selected regions and countries, showing similarities and differences among the countries. Importantly, the results showed that most of the regions and countries defined a certain physical distancing and suggested how to achieve the distancing and reduce crowding in detail. Furthermore, the results indicated that several countries contained guidance for shared housing and shared transportation. Both components are considered to reflect distinctive risk factors in food-producing settings.

## Appendix A. Names and Abbreviations of Organizations

**Table A-1. Names and Abbreviations of Organizations**

<b>Regions or countries</b>	<b>Organizations Names</b>	<b>Abbreviations</b>
	World Health Organization	WHO
	Food and Agriculture Organization of the United Nations	FAO
	Economic Commission for Latin America and the Caribbean	ECLAC
	International Fund for Agricultural Development	IFAD
	International Labor Organization	ILO
	United Nations World Food Programme	WFP
<b>Europe</b>	WHO Regional Office for Europe	WHO/Europe
	European Commission	
	European Union information agency for occupational safety and health	EU-OSHA
	European Centre for Disease Prevention and Control	ECDC
	European Union	EU
	European Economic Area	EEA
<b>Americas</b>	Pan American Health Organization, Regional Office for the Americas of the World Health Organization	PAHO/WHO
<b>Africa</b>	World Health Organization, Regional Office for Africa	WHO, Regional Office for Africa
	African Union	AU
	Africa Centres for Disease Control and Prevention	Africa CDC
<b>South-East Asia</b>	World Health Organization, Regional Office for South-East Asia	WHO Regional Office for South-East Asia
<b>Eastern Mediterranean</b>	World Health Organization, Regional Office for Eastern Mediterranean	WHO Regional Office for the Eastern Mediterranean
<b>Western Pacific</b>	World Health Organization Western Pacific Region	
<b>the UK</b>	the website of the government of UK	GOV.UK
	Health and Safety Executive	HSE
	Department for Environment, Food & Rural Affairs	
	Public Health England	
<b>Ireland</b>	the website of the government of Ireland	gov.ie
	Health Service Executive	HSE
<b>the US</b>	U.S. Food and Drug Administration	FDA
	U.S. Department of Agriculture	USDA
	Center for Disease Control and Prevention	CDC
	Occupational Safety and Health Administration	OSHA
	U.S. Department of Labor	DOL
<b>Canada</b>	the Government of Canada	
	Public Health Agency of Canada	PHAC
	Agriculture and Agri-Food Canada	AAFC
	Canadian Food Inspection Agency	CFIA
<b>Australia</b>	the website of Australian government	
	Australian Government Department of Health	
	Safe Work Australia	SWA

**Table A-1. (Continued)**

<b>Regions or countries</b>	<b>Organizations Names</b>	<b>Abbreviations</b>
<b>New Zealand</b>	the website of the New Zealand government Ministry of Health Ministry of Primary Industries WorkSafe, New Zealand	MPI
<b>Republic of South Africa</b>	the website of the South African government National department of Health, Republic of South Africa	
<b>Japan</b>	Prime Minister of Japan and his Cabinet Ministry of Health, Labour and Welfare Ministry of Agriculture, Forestry and Fisheries	MHLW MAFF



## Appendix B. Protocol

### PURPOSE OF PRPTOCOL

This protocol provides a procedure on how to conduct a review of guidance or guidelines regarding the protection of food workers from COVID-19. The procedure consists of identification, screening, data extraction, and results.

### PROCEDURES

#### 1. Identification

##### 1.1. Search strategy

In order to identify relevant documents, two methods are used.

- To do search Google database;
- To search official websites for governments, health institutions, or safety and labor institutions for the target regions and countries

##### 1.2. Identification of target regions, countries, and institutions

- ***The Specialized Agencies of the United Nations.***: Since this topic includes issues relating to public health and food industry, the WHO and the FAO are selected as global institutions to be searched.
- ***Regional institutions***: The target regions are selected based on the WHO categorization, in which the WHO Member States are categorized into six regions [47]. Then, for each region, the regional institutions of WHO, the health institutions, or the websites of the safety and labor institutions are selected.
- ***Countries***: Countries are selected from the countries where a primary language, a national language, or an official language is English or Japanese using the following criteria.
  - (i) Countries where a primary language, a national language, or an official language is English or Japanese
  - (ii) One or two countries from each of Asia, Americas, Africa, Europe and Oceania

*Japan (Asia):*

Japan is selected as a country where Japanese is a national language.

*The UK (Europe), the US (Americas), Canada (Americas), Australia (Oceania), New Zealand (Oceania), and Ireland (Europe):*

The UK government classifies 18 countries as majority native English-speaking countries in addition to the UK [48]. The UK government defined that citizens of these countries do not need to prove knowledge of English for British citizenship and settling [49]. From the UK

and the 18 countries, we select the largest countries in real GDP per capita (> \$40,000); Ireland, the U.S., Australia, Canada, the UK, Malta, and New Zealand [50]. Since the UK, Ireland, and Malta are European countries, Malta, the third country, is excluded.

*South Africa (Africa):*

Since African countries are not included in the majority native English-speaking countries classified by the UK government [48, 49], an African country is separately selected. Within the top ten most populous countries in Africa [51], South Africa is the largest country regarding real GDP per capita and uses English as one of the official languages [50]. Thus, South Africa is selected from African countries.

- Then, the websites of their governments, health institutions, and/or safety and labor institutions are basically searched. For the U.S., in order to focus on information relating to food workers, the FDA and the USDA were selected for searching institutions, instead of the U.S. Department of Labor (DOL) and the Occupational Safety and Health Administration (OHSA)

### **1.3. Identification of the official websites and pages**

- Official websites of target institutions or countries' governments are identified.
- Then, the official websites of health institutions, and/or safety and labor institutions for the target institutions/countries are searched and identified.
- Then, the main pages for COVID-19 information or the pages for guidance documents are identified on the official websites.

### **1.4. Building of search strings for the search of the Google database**

Search strings are identified by trial searches using Google advanced search.

#### **1.4.1. Sites for search**

Currently, there is huge information about COVID-19. Thus, to search information from reliable sources, a site address is specified for each google search. The site addresses are acquired from the official websites for governments, institutions, health institutions, or safety and labor institutions that are identified above.

#### **1.4.2. Strings for search**

The same strings for search are used for all countries and institutions, as much as possible. However, if necessary, the strings are adjusted depending on the institutions/countries, considering wordings, definitions, information volumes, and other factors. For the Japanese institutions, the search strings are used for the searches of English sites.

**Table B-1. Regions, Countries, and institutions identified for searching**

<b>Regions, Countries, and institutions identified for data search</b>	
<b>Specialized Agencies of the United Nations</b>	
	World Health Organization (WHO)
	Food and Agriculture Organization of the United Nations (FAO)
<b>Regions</b>	
<b>Europe</b>	WHO Regional Office of Europe European Commission the European Union information agency for occupational safety and health (EU-OSHA) European Centre for Disease Prevention and Control (ECDC)
<b>Americas</b>	Pan American Health Organization, Regional Office for the Americas of the World Health Organization (PAHO/WHO)
<b>Africa</b>	World Health Organization, Regional Office for Africa African Union Africa Centres for Disease Control and Prevention (Africa CDC)
<b>South-East Asia</b>	World Health Organization, Regional Office for South-East Asia
<b>Eastern Mediterranean</b>	World Health Organization, Regional Office for Eastern Mediterranean
<b>Western Pacific</b>	World Health Organization Western Pacific Region
<b>Countries</b>	
<b>the UK</b>	the website of the government of UK (GOV.UK) <sup>a</sup> Health and Safety Executive (HSE)
<b>Ireland</b>	the website of the government of Ireland (gov.ie) Health Service Executive (HSE)
<b>the U.S.</b>	U.S. Food and Drug Administration (FDA) U.S. Department of Agriculture (USDA) Center for Disease Control and Prevention (CDC)
<b>Canada</b>	the Government of Canada <sup>b</sup> Public Health Agency of Canada
<b>Australia</b>	Australian government <sup>c</sup> Australian Government Department of Health
<b>New Zealand</b>	the website of the New Zealand government <sup>d</sup> Ministry of Health, New Zealand government WorkSafe, New Zealand government
<b>Republic of South Africa</b>	the website of the South African government National department of Health, Republic of South Africa
<b>Japan</b>	Prime Minister of Japan and his Cabinet Ministry of Health, Labour and Welfare (MHLW) Ministry of Agriculture, Forestry and Fisheries (MAFF)

<sup>a</sup> Documents issued by the Department for Environment, Food & Rural Affairs are included.

<sup>b</sup> Documents issued by the Agriculture and Agri-Food Canada (AAFC) or the Canadian Food Inspection Agency (CFIA) are included.

<sup>c</sup> Documents issued by the Safe Work Australia (SWA) are included.

<sup>d</sup> Documents issued by the Ministry of Primary Industry (MPI) are included.

**Table B-2. Sites for searching and Strings for searching**

Sites for search	Official websites of the global institutions, regional institutions, governments, health institutions, and/or safety and labor institutions	
Strings for search	occupation* food worker health (guidance OR guideline) "COVID-19" "workplace" -child*: site *****	If necessary, the strings are adjusted

## 1.5. Conducting search

### 1.5.1. Searching on Google database

For each institution, a search of the Google database is conducted using the search strings shown in Table B-2. If there are no search results, or many results (more than around 50), additional searches are conducted using adjusted search strings.

#### *Adjustments of search strings - No results from the basic search strings:*

- If there are no results from a search using the basic search strings, one or some keywords are eliminated and a search is conducted again. Usually, -child\*, occupation\*, and health are checked for elimination.
- If there are no results after the elimination of those keywords, further eliminations of food or "workplace" are considered.

#### *Adjustments of search strings-Many results from the basic search strings:*

- If there are many results from a search using the basic search strings, one or some keywords are added to the search strings. The keywords to be added are slightly different depending on the institutions and the volume of the first search. Possible keywords are as follows.
  - "seasonal worker", "seasonal", "critical workers", or "critical"; mainly used for the searches on the European institutions' sites.
  - "essential", "protect""": Used for the searches in CDC"

### 1.5.2. Searching on the official websites

The searches of the official websites started from COVID-19 related pages, if applicable. Then several ways are adopted depending on each official site. If it is challenging to search information within the COVID-19 related pages, searches within the official websites or the guidance-related pages are conducted using keywords. For the institutions of Japan, both the websites written in Japanese and written in English sites are searched. Table B-3 shows a summary of B-3 summarizes the procedures for Searching on the official website.

**Table B-3. Procedures for Searching on the official websites**

Pages to be searched	Institutions
1) COVID-19 related pages, or COVID-19 related pages + guidance/publications related pages: The COVID-related pages, or the guidance or publication related pages within COVID-19 related pages are searched.	WHO, European Commission , EU-OSHA, PAHO/WHO, WHO Africa, WHO South-East Asia, WHO Western Pacific, UK HSE, FDA. USDA, CDC, Australian Government, South African Government, MHLW (English site), MAFF (English site), MHLW, and MAFF
2) COVID-19 related pages + guidance or publications related pages using key words: The guidance or publication related pages within COVID-19 related pages are searched using key words.	WHO Europe, ECDC, ACDC, GOV.UK, Government of Canada, Public Health Agency of Canada, and New Zealand Government
3) Guidance or publications related pages: The guidance or publication related pages are searched.	National department of Health, Republic of South Africa, and MHLW (English site)
4) Guidance or publications related pages using key words: The guidance or publication related pages are searched using key words.	FAO, gov.ie, Ireland HSE, Australian Government Department of Health, and New Zealand Government Ministry of Health
5) Whole official websites using key words: The whole official websites are searched using key words.	PAHO/WHO, Prime Minister of Japan and his Cabinet (English site), Prime Minister of Japan and his Cabinet, and MHLW (English site)

## 2. Screening.

The screening of the identified documents was performed in two steps.

### 2.1. First Screening

The first screenings of search results are conducted using the inclusion criteria and the exclusion criteria.

#### 2.1.1. Inclusion Criteria for the first screening

- (i) Information from reliable sources, such as official websites for governments, health institutions, and/or safety and labor institutions for the target areas, or information from academic articles
- (ii) Information relating to COVID-19
- (iii) Information mainly relating to the protection of food workers from COVID-19: This includes the information specific for food workers and the information for general workers that contain food workers. This does not include information specific to food workers other than food production workers. For example, information specific to workers in food distributions and food retails is not included.

- (iv) Guideline/guidance: This includes the information that is actually guidance even if it is not clearly defined as a guideline/guidance.
- (v) Information or academic articles issued since 2020
- (vi) Information written in English or Japanese: This includes the information translated to English by the institutions or governments.

### **2.1.2. Exclusion Criteria for the first screening**

- (i) Information other than written ones: Information that is not written, such as video, is excluded.
- (ii) Information in internal documents: Information in internal documents, such as meeting memos, or draft documents, are excluded. However, draft documents that are opened to the public are not excluded as far as the final versions are not issued.
- (iii) Summaries of selected guidance documents or guidelines are considered duplicated documents, and excluded.

## **2.2. Second Screening**

The second screenings were conducted using the inclusion criteria and the exclusion criteria for the second screening. The inclusion criteria for the second screening were the same as the inclusion criteria for the first screening other than (iii). In the second screening, several documents were excluded by applying the criteria for the first screening more strictly.

### **2.2.1. Inclusion Criteria for the second screening**

- (i) Information from reliable sources, such as official websites for governments, health institutions, or safety and labor institutions for the target areas, or information from academic articles;
- (ii) Information relating to COVID-19;
- (iii) Information mainly relating to the protection of food workers from COVID-19. This included the information specific to food workers. The information that is not specific to food workers were excluded. In addition, the information that are specific to food workers other than food production workers are excluded. For example, information specific to workers in food distributions and food retails is not included.
- (iv) Guideline or guidance. This criterion included the information whose contents are guidance even if it is not clearly defined as a guideline or guidance;
- (v) Information or academic articles issued since 2020;
- (vi) Information that is written in English or Japanese. This criterion included the information translated to English by the institutions or governments.

### **2.2.2. Exclusion Criteria for the second screening**

- (i) Information that was not written, such as a video source, is excluded;
- (ii) Information in internal documents, such as meeting memos, or draft documents, is excluded. However, draft documents that are available to the public, in place of final versions, are not excluded.
- (iii) Summaries of selected guidance documents or guidelines are considered duplicated documents, and excluded.

## **3. Data Extraction**

### **3.1. Extraction of data**

- Information on the selected documents is reviewed.
- Then, the following information is extracted;
  - Regions, countries, and institutions that issued the documents, title of the documents, date of issue or date of update, type of the documents, and targeted industry of the documents
  - Information on practices to prevent workers in food-producing industries from acquiring COVID-19. The information are categorized into three main categories;
    - (i) Control at the workplace, including at shared housing and shared transportation,
    - (ii) Hygiene control including hand-washing, face-coverings, and PPE;
    - (iii) Managing workers, including screening, managing when suspected positive cases arise, and education.
- Furthermore, the data for each category is divided into several sub-categories
- The data extracted from the selected documents are stored in an excel file.
- The review for data extraction is conducted four days to nine weeks after from the first data extraction by the same person as the one who conducted the first data extraction.

### **3.2. Data base**

- The database to store extracted data includes the following information;
  - Regions, countries, or institutions that were searched
  - Countries or institutions that issued the selected documents
  - Title, URL, date of issue or update, type of the selected documents
  - Date of access, date of data extraction, and date of the review
  - Summary of practices to prevent food workers from acquiring COVID-19

## **4. Data analysis**

Data analysis is conducted using the data extracted from the selected documents.

- The types and targeted industries of the documents among the regions and countries by comparing the number of documents in each type and each industry are analyzed.
- Then, the main features in each category and sub-category are summarized and analyzed by comparing the features, such as similarity and difference among the regions and countries. .



## Appendix C. Characteristics of the selected documents

**Table C-1. Characteristics of the selected documents**

Documents						
Regions/ countries	Institutions	Title of documents		Date of issue/update	Type <sup>a</sup>	Target Industry
WHO	WHO, FAO	"COVID-19 and Food Safety: Guidance for competent authorities responsible for national food safety control systems, Interim guidance"	[52]	April 22, 2020	Interim Guidance	Food industry
	WHO, FAO	"COVID-19 and Food Safety: Guidance for Food Businesses, Interim guidance"	[53]	April 7, 2020	Interim Guidance	Food industry
	WHO	"Coronavirus disease (COVID-19): Food businesses"	[54]	May 15, 2020	Questions and answers	Food industry
FAO	FAO, ECLAC	"Food systems and COVID-19 in Latin America and the Caribbean: Health risks; safety of workers and food safety" <sup>b</sup>	[55]	May 14, 2020	Bulletin	Food industry
Europe	ECDC	"COVID-19 clusters and outbreaks in occupational settings in the EU/EEA and the UK" <sup>c</sup>	[38]	August 11, 2020	Technical report	Occupational settings
the UK	<sup>d</sup>	"Guidance, Coming to the UK for seasonal agricultural work on English farms"	[56]	April 22, 2021	Guidance	Agriculture
	<sup>d</sup> , Public Health England	"Guidance, Guidance for food businesses on coronavirus (COVID-19)"	[57]	May 21, 2020	Guidance	Food industry
	<sup>d</sup> , Public Health England	"Guidance, Working safely in food processing and production settings (easy-to-translate version)"	[58]	May 21, 2020	Guidance	Food industry
the U.S.	FDA, OSHA	"Employee Health and Food Safety Checklist for Human and Animal Food Operations During the COVID-19 Pandemic"	[59]	August 11, 2020	Checklist	Food industry
	FDA, USDA	"Food and Agriculture: Considerations for Prioritization of PPE, Cloth Face Coverings, Disinfectants, and Sanitation Supplies During the COVID-19 Pandemic"	[60]	May 20, 2020	Recommendation	Food and agricultural industry
	FDA <sup>e</sup>	"Use of Respirators, Facemasks, and Cloth Face Coverings in the Food and Agriculture Sector During Coronavirus Disease (COVID-19) Pandemic"	[61]	April 2020	Fact sheets	Food and agricultural sector
	FDA <sup>f</sup>	"What to Do If You Have a COVID-19 Confirmed Positive Worker or Workers Who Have Been Exposed to a Confirmed Case of COVID-19"	[62]	July 17, 2020 <sup>g</sup>	Outlines of key steps	Food and agricultural sector
	FDA	"COVID-19 Vaccination & the Food and Agriculture Sector"	[63]	June 1, 2021 <sup>g</sup>	Information	Food and agricultural sector
	USDA	"Food Supply Chain"	[64]	n.d.	Questions and answers	Agriculture
	CDC, DOL	"Agriculture Workers and Employers, Interim Guidance from CDC and the U.S. Department of Labor"	[42]	February 2, 2021	Interim Guidance	Agriculture

**Table C-1. (Continued)**

<b>Documents</b>						
<b>Regions/ countries</b>	<b>Institutions</b>	<b>Title of documents</b>		<b>Date of issue/update</b>	<b>Type <sup>a</sup></b>	<b>Target Industry</b>
	<b>CDC, OSHA</b>	"Meat and Poultry Processing Workers and Employers, Interim Guidance from CDC and the Occupational Safety and Health Administration (OSHA)"	[43]	February 6, 2021	Interim Guidance	Meat and meat processing industry
	<b>CDC, OSHA</b>	"Protecting Seafood Processing Workers from COVID-19, Interim Guidance from CDC and the Occupational Safety and Health Administration (OSHA). Developed in consultation with the Food and Drug Administration (FDA)"	[44]	February 8, 2021	Interim Guidance	Seafood processing
<b>Canada</b>	<b>AAFC, Public Health Agency of Canada <sup>h</sup></b>	"Workplace guidance for agriculture and agri-food sector employers and employees"	[65]	March 16, 2021	Guidance	Agriculture and agri-food sector
	<b>AAFC</b>	"Checklist for the control of COVID-19 in agricultural facilities"	[66]	September 8, 2020	Checklist	Agriculture
	<b>CFIA</b>	"CFIA expectations for the prevention of and response to suspect and confirmed cases of COVID-19 by Meat Slaughter and Processing Establishments"	[67]	April 24, 2020	Information	Meat Slaughter and Processing
<b>Australia</b>	<b>SWA</b>	"COVID-19 for Workplaces Pack, For the Worker in the Agriculture industry"	[68]	i	Information	Agriculture
	<b>SWA</b>	"COVID-19 for Workplaces Pack, For the Employer in the Agriculture industry"	[69]	i	Information	Agriculture
	<b>SWA</b>	"COVID-19 for Workplaces Pack, For the Worker in the Food processing & manufacturing industry"	[70]	i	Information	food processing & manufacturing
	<b>SWA</b>	"COVID-19 for Workplaces Pack, For the Employer in the Food processing & manufacturing industry"	[71]	i	Information	food processing & manufacturing
<b>New Zealand</b>	<b>MPI</b>	"COVID-19 and food safety in Alert Level 2"	[72]	September 11, 2020 <sup>j</sup>	Information and advice	Food industry
	<b>MPI</b>	"MPI generic guidance on COVID-19 safety measures for primary industry and food businesses at Alert Level 2"	[73]	August 28, 2020	Guidance	Primary industry and food businesses.
	<b>MPI</b>	"COVID-19 and food safety in Alert Level 3, Advice around food safety and coronavirus and our guidance for food handlers and food businesses during Alert Level 3 "	[74]	September 12, 2020 <sup>j</sup>	Information and advice	Food industry
	<b>MPI</b>	"MPI generic guidance on COVID-19 safety measures for primary industry and food businesses at Alert Level 3"	[75]	August 28, 2020	Guidance	Primary industry and food businesses.

**Table C-1. (Continued)**

Documents						
Regions/ countries	Institutions	Title of documents		Date of issue/update	Type <sup>a</sup>	Target Industry
New Zealand	MPI	"MPI guidance on COVID-19 safety measures for New Zealand red meat, poultry meat and seafood processors at Alert Level 3"	[76]	August 28, 2020	Guidance	Meat and seafood processing <sup>k</sup>
	MPI	"Information for fishers during Alert Level 3"	[77]	September 11, 2020 <sup>j</sup>	Information and advice	Fishers
Japan	MHLW	"Shokuhin sangyou jigyousha no juugyouin ni shingata korona uirusu kansensha ga hassei shita toki no taiou oyobi jigyoukeizoku ni kansuru kihontekina gaidorain ni tsuite (jouhou teikyou)" (About basic guidelines for response and business continuity when a new coronavirus-infected person occurs in an employee of a food industry operator (providing information))	[78]	March 16, 2020	Information about basic guideline	Food industry
	MAFF	"Shokuhin sangyou jigyousha no juugyouin ni shingata korona uirusu kansensha ga hassei shita toki no taiou oyobi jigyoukeizoku ni kansuru kihontekina gaidorain" (Basic guidelines for response and business continuity when an employee of a food industry operator is infected with the new coronavirus)	[79]	n.d.	Basic guideline	Food industry
	MAFF	"Nougyou ni okeru shingata korona uirusu kansensha ga hassei shita toki no taiou oyobi jigyoukeizoku ni kansuru kihontekina gaidorain" (Basic guidelines for response and business continuity when a new coronavirus-infected person occurs in agriculture)	[80]	n.d.	Basic guideline	Agriculture
	MAFF	"Chikusan jigyousha ni shingata korona uirusu kansensha ga hassei shita toki no taiou oyobi jigyoukeizoku ni kansuru kihontekina gaidorain" (Basic guidelines for response and business continuity when a new coronavirus-infected person occurs in a livestock operator)	[81]	n.d.	Basic guideline	Livestock business
	MAFF	"Gyogyousha ni shingata korona uirusu kansensha ga hassei shita toki no taiou oyobi jigyoukeizoku ni kansuru kihontekina gaidorain" (Basic guidelines for response and business continuity when a fisherman is infected with the new coronavirus)	[82]	n.d.	Basic guideline	Fishers including crew

a Documents that are not categorized into specific types are described as information;

b The target region is Latin America and the Caribbean;

c The target region is the EU/EEA and the UK. This document includes risk factors of COVID-19, but not include practices to protect workers from COVID-19;

d Department for Environment, Food & Rural Affairs;

e This fact sheets is developed in collaboration with CDC;

f This summary is derived from CDC recommendations;

g The date that data is current at the time of access;

h This guidance was assembled in consultation with the Public Health Agency of Canada;

i The dates of update are different depending on pages;

j The date of last reviewed;

k Red meat and poultry primary and secondary processing.

## Reference

- [1] World Health Organization. "Coronavirus, overview." [https://www.who.int/health-topics/coronavirus#tab=tab\\_1](https://www.who.int/health-topics/coronavirus#tab=tab_1) (accessed July 14, 2021).
- [2] World Health Organization, "WHO Coronavirus Disease (COVID-19) Dashboard." Accessed: July 14, 2021. [Online]. Available: <https://covid19.who.int/>
- [3] Center for Disease Control and Prevention, "COVID-19, How COVID-19 Spreads," Updated May 13, 2021. Accessed: July 14, 2021. [Online]. Available: <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html>
- [4] World Health Organization. "Country & Technical Guidance - Coronavirus disease (COVID-19)." <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance> (accessed July 15, 2021).
- [5] World Health Organization, "Coronavirus disease (COVID-19) advice for the public," Updated on July 1, 2021. Accessed: July 15, 2021. [Online]. Available: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>
- [6] United Nations. "COVID-19 Response, UN Response to COVID-19." <https://www.un.org/en/coronavirus/un-response> (accessed July 15, 2021).
- [7] Center for Disease Control and Prevention, "COVID-19, Your Health," Updated Mar. 23, 2021. Accessed: July 15, 2021. [Online]. Available: <https://www.cdc.gov/coronavirus/2019-ncov/your-health/index.html>
- [8] Center for Disease Control and Prevention, "COVID-19, Guidance for unvaccinated people, How to Protect Yourself & Others," Updated June 11, 2021. Accessed: July 15, 2021. [Online]. Available: <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html>
- [9] Government of Canada, "Coronavirus disease (COVID-19): Prevention and risks," Date modified: July 13, 2021. Accessed: July 15, 2021. [Online]. Available: <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/prevention-risks.html>
- [10] European Centre for Disease Prevention and Control, "How to protect yourself and others," Last updated Mar 9, 2021. Accessed: July 15, 2021. [Online]. Available: <https://www.ecdc.europa.eu/en/covid-19/prevention-and-control/protect-yourself>
- [11] Ministry of Health, Labour and Welfare, "Information on health and medical consultation," n.d. [Online]. Available: [https://www.mhlw.go.jp/stf/covid-19/kenkou-iryousoudan\\_00006.html#1-1](https://www.mhlw.go.jp/stf/covid-19/kenkou-iryousoudan_00006.html#1-1), Retrieved information partially and edited on July 15, 2021, from the Official Website of the Ministry of Health, Labour and Welfare
- [12] World Health Organization, Regional Officer for the Eastern Mediterranean, "How can I help stop COVID-19?," vol. 2021. Accessed: July 15, 2021. [Online]. Available: <http://www.emro.who.int/health-topics/corona-virus/how-can-i-help-stop-covid-19.html>
- [13] National Centre for Disease Control, Ministry of Health & Family Welfare, Government of India, "COVID19," Last Updated: July 13, 2021. Accessed: July 15, 2021. [Online]. Available: <https://ncdc.gov.in/index4.php?lang=1&level=0&linkid=132&lid=549>

- [14] GOV.UK. "Coronavirus (COVID-19)." <https://www.gov.uk/coronavirus> (accessed July 15, 2021).
- [15] Gobierno de Mexico. "Todo sobre el COVID-19." <https://coronavirus.gob.mx/> (accessed July 15, 2021, 2021).
- [16] Center for Disease Control and Prevention, "COVID-19 Critical Infrastructure Sector Response Planning," Updated December 3, 2020. Accessed: July 15, 2021. [Online]. Available: [https://www.cdc.gov/coronavirus/2019-ncov/community/critical-infrastructure-sectors.html?CDC\\_AA\\_refVal](https://www.cdc.gov/coronavirus/2019-ncov/community/critical-infrastructure-sectors.html?CDC_AA_refVal)
- [17] International Labour Organization, "CHAPTER V Substantive provisions of labour legislation: The right to strike," Last Updated 2001. Accessed: July 15, 2021. [Online]. Available: <https://www.ilo.org/legacy/english/dialogue/ifpdial/llg/noframes/ch5.htm#6>
- [18] J. Gaitens, M. Condon, E. Fernandes, and M. McDiarmid, "COVID-19 and Essential Workers: A Narrative Review of Health Outcomes and Moral Injury," (in eng), *Int J Environ Res Public Health*, vol. 18, no. 4, Feb 4 2021, doi: 10.3390/ijerph18041446.
- [19] Cybersecurity & Infrastructure Security Agency. "Identifying critical infrastructure during COVID-19." <https://www.cisa.gov/identifying-critical-infrastructure-during-covid-19> (accessed July 15, 2021).
- [20] Cybersecurity & Infrastructure Security Agency. "Guidance on the Essential Critical Infrastructure Workforce." <https://www.cisa.gov/publication/guidance-essential-critical-infrastructure-workforce> (accessed July 15, 2021).
- [21] Public Safety Canada, "Guidance on Essential Services and Functions in Canada During the COVID-19 Pandemic," Date modified: January 15, 2021. Accessed: July 15, 2021. [Online]. Available: <https://www.publicsafety.gc.ca/cnt/ntnl-scrtr/crtcl-nfrstrctr/esf-sfe-en.aspx>
- [22] A. K. Ramos, A. E. Lowe, J. J. Herstein, S. Schwedhelm, K. K. Dineen, and J. J. Lowe, "Invisible No More: The Impact of COVID-19 on Essential Food Production Workers," (in eng), *J Agromedicine*, vol. 25, no. 4, pp. 378-382, Oct 2020, doi: 10.1080/1059924x.2020.1814925.
- [23] Center for Disease Control and Prevention. "COVID-19, Public Health Activity Guidance." <https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-covid-19-client-interaction.html> (accessed July 15, 2021).
- [24] World Health Organization. "Year of Health and Care Workers 2021." <https://www.who.int/campaigns/annual-theme/year-of-health-and-care-workers-2021> (accessed July 15, 2021).
- [25] European Centre for Disease Prevention and Control, "Infection prevention and control and preparedness for COVID-19 in healthcare settings - sixth update, Technical report," February 9, 2021. Accessed: July 15, 2021. [Online]. Available: <https://www.ecdc.europa.eu/en/publications-data/infection-prevention-and-control-and-preparedness-covid-19-healthcare-settings>
- [26] Center for Disease Control and Prevention, "Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID-19) Pandemic," Updated February 23, 2021. Accessed: July 15, 2021. [Online].

- Available: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html>
- [27] F. Becot, S. Inwood, C. Bendixsen, and C. Henning-Smith, "Health Care and Health Insurance Access for Farm Families in the United States during COVID-19: Essential Workers without Essential Resources?," (in eng), *J Agromedicine*, vol. 25, no. 4, pp. 374-377, Oct 2020, doi: 10.1080/1059924x.2020.1814924.
- [28] Food and Agriculture Organization of the United Nations. "Novel Coronavirus (COVID-19)." <http://www.fao.org/2019-ncov/en/> (accessed July 15, 2021, 2021).
- [29] World Bank, "Joint Statement on COVID-19 Impacts on Food Security and Nutrition. FAO, IFAD, WFP and the World Bank on the occasion of the Extraordinary G20 Agriculture Minister's Meeting," APRIL 21, 2020. Accessed: July 15, 2021. [Online]. Available: <https://www.worldbank.org/en/news/statement/2020/04/21/joint-statement-on-covid-19-impacts-on-food-security-and-nutrition>
- [30] COVID19.CA.GOV, "Essential workforce," Last updated July 13, 2021. Accessed: July 15, 2021. [Online]. Available: <https://covid19.ca.gov/essential-workforce/>
- [31] GOV.UK, Department of Health and Social Care, "Guidance, Essential workers prioritised for COVID-19 testing," February 25, 2021. Accessed: July 15, 2021. [Online]. Available: <https://www.gov.uk/guidance/essential-workers-prioritised-for-covid-19-testing>
- [32] Scottish Government, "Publication – Advice and Guidance, Coronavirus (COVID-19): getting tested in Scotland," Last updated: July 13, 2021. Accessed: July 15, 2021. [Online]. Available: <https://www.gov.scot/publications/coronavirus-covid-19-getting-tested/pages/covid-symptoms/>
- [33] Llywodraeth Cymru Welsh Government, "Policy and Strategy, Identifying children of critical workers: guidance," Last updated: December 14, 2020. Accessed: July 15, 2021. [Online]. Available: <https://gov.wales/identifying-children-critical-workers-guidance>
- [34] NIBUINESS INFO.CO.UK, "Coronavirus: Guide to making workplaces safer and priority sector list," June 5, 2020. Accessed: July 15, 2021. [Online]. Available: <https://www.nibusinessinfo.co.uk/content/coronavirus-guide-making-workplaces-safer-and-priority-sector-list>
- [35] Northern Ireland Executive, "Priority Sectors during COVID-19." Accessed: July 15, 2021. [Online]. Available: [https://www.nibusinessinfo.co.uk/sites/default/files/Priority-Sectors-List\\_1.pdf](https://www.nibusinessinfo.co.uk/sites/default/files/Priority-Sectors-List_1.pdf)
- [36] A. Reid, E. Rhonda-Perez, and M. B. Schenker, "Migrant workers, essential work, and COVID-19," (in eng), *Am J Ind Med*, vol. 64, no. 2, pp. 73-77, Feb 2021, doi: 10.1002/ajim.23209.
- [37] European Centre for Disease Prevention and Control, "COVID-19 clusters and outbreaks in occupational settings in the EU/EEA and the UK, Technical report, Executive summary," August 11, 2020. Accessed: July 15, 2021. [Online]. Available: <https://www.ecdc.europa.eu/en/publications-data/covid-19-clusters-and-outbreaks-occupational-settings-eueea-and-uk>

- [38] European Centre for Disease Prevention and Control, "COVID-19 clusters and outbreaks in occupational settings in the EU/EEA and the UK," August 11, 2020. Accessed: April 5, 2021. [Online]. Available: <https://www.ecdc.europa.eu/sites/default/files/documents/COVID-19-in-occupational-settings.pdf>
- [39] The national COVID-19 outbreak monitoring group, "COVID-19 outbreaks in a transmission control scenario: challenges posed by social and leisure activities, and for workers in vulnerable conditions, Spain, early summer 2020," (in eng), *Euro Surveill*, vol. 25, no. 35, Sep 2020, doi: 10.2807/1560-7917.Es.2020.25.35.2001545.
- [40] T. Waltenburg Ma Fau - Victoroff *et al.*, "Update: COVID-19 Among Workers in Meat and Poultry Processing Facilities - United States, April-May 2020," (in eng), no. 1545-861X (Electronic).
- [41] M. A. Waltenburg *et al.*, "Coronavirus Disease among Workers in Food Processing, Food Manufacturing, and Agriculture Workplaces," (in eng), *Emerg Infect Dis*, vol. 27, no. 1, pp. 243-9, Jan 2021, doi: 10.3201/eid2701.203821.
- [42] Center for Disease Control and Prevention and U.S. Department of Labor, "Agriculture Workers and Employers, Interim Guidance from CDC and the U.S. Department of Labor," Updated February 2, 2021. Accessed: May 2, 2021. [Online]. Available: <https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-agricultural-workers.html>
- [43] Center for Disease Control and Prevention and Occupational Safety and Health Administration, "Meat and Poultry Processing Workers and Employers, Interim Guidance from CDC and the Occupational Safety and Health Administration (OSHA)," Updated February 6, 2021. Accessed: May 30, 2021. [Online]. Available: <https://www.cdc.gov/coronavirus/2019-ncov/community/organizations/meat-poultry-processing-workers-employers.html>
- [44] Center for Disease Control and Prevention and Occupational Safety and Health Administration, "Protecting Seafood Processing Workers from COVID-19, Interim Guidance from CDC and the Occupational Safety and Health Administration (OSHA). Developed in consultation with the Food and Drug Administration (FDA)," Updated February 8, 2021. Accessed: May 2, 2021. [Online]. Available: <https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-seafood-processing.html>
- [45] Center for Disease Control and Prevention. "For Specific Industries and Occupations, Plan, Prepare, and Respond." <https://www.cdc.gov/coronavirus/2019-ncov/community/workplaces-businesses/specific-industries.html#public-services-sanitation> (accessed July 15, 2021).
- [46] D. Moher, A. Liberati, J. Tetzlaff, and D. G. Altman, "Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement," (in eng), *PLoS Med*, vol. 6, no. 7, p. e1000097, Jul 21 2009, doi: 10.1371/journal.pmed.1000097.
- [47] World Health Organization. "WHO regional offices." <https://www.who.int/about/who-we-are/regional-offices> (accessed July 15, 2021).

- [48] The University of Sheffield. "List of majority native English speaking countries." <https://www.sheffield.ac.uk/international/english-speaking-countries> (accessed July 10, 2021).
- [49] GOV.UK. "Prove your knowledge of English for citizenship and settling." <https://www.gov.uk/english-language/exemptions> (accessed July 10, 2021).
- [50] Central Intelligence Agency, "The World Factbook," Edition: July 8, 2021. Accessed: July 9, 2021. [Online]. Available: <https://www.cia.gov/the-world-factbook/>
- [51] Central Intelligence Agency, "The World Factbook, Country Comparisons - Population." Accessed: July 9, 2021. [Online]. Available: <https://www.cia.gov/the-world-factbook/field/population/country-comparison>
- [52] World Health Organization and Food and Agriculture Organization of the United Nations, "COVID-19 and Food Safety: Guidance for competent authorities responsible for national food safety control systems, Interim guidance," April 22, 2020. Accessed: April 5, 2021. [Online]. Available: [https://www.who.int/publications/i/item/WHO-2019-nCoV-Food\\_Safety\\_authorities-2020.1](https://www.who.int/publications/i/item/WHO-2019-nCoV-Food_Safety_authorities-2020.1)
- [53] World Health Organization and Food and Agriculture Organization of the United Nations, "COVID-19 and Food Safety: Guidance for Food Businesses, Interim guidance", April 7, 2020. Accessed: April 5, 2021. [Online]. Available: <https://www.who.int/publications/i/item/covid-19-and-food-safety-guidance-for-food-businesses>
- [54] World Health Organization. "Coronavirus disease (COVID-19): Food businesses, Q&A." <https://www.who.int/news-room/q-a-detail/coronavirus-disease-covid-19-food-businesses> (accessed May 16, 2021).
- [55] Food and Agriculture Organization of the United Nations and Economic Commission for Latin America and the Caribbean, "Food systems and COVID-19 in Latin America and the Caribbean: Health risks; safety of workers and food safety, Bulletin 4," May 14, 2020. Accessed: March 27, 2021. [Online]. Available: <http://www.fao.org/3/ca9112en/CA9112EN.pdf>
- [56] Department for Environment, Food & Rural Affairs, , "Guidance, Coming to the UK for seasonal agricultural work on English farms," Last updated April 22, 2021. Accessed: May 17, 2021. [Online]. Available: <https://www.gov.uk/guidance/coming-to-the-uk-for-seasonal-agricultural-work-on-english-farms>
- [57] Department for Environment, Food & Rural Affairs, and Public Health England, "Guidance, Guidance for food businesses on coronavirus (COVID-19)," Updated May 21, 2021. Accessed: May 29, 2021. [Online]. Available: <https://www.gov.uk/government/publications/covid-19-guidance-for-food-businesses/guidance-for-food-businesses-on-coronavirus-covid-19>
- [58] Department for Environment, Food & Rural Affairs, and Public Health England, "Guidance, Working safely in food processing and production settings (easy-to-translate version)," Updated May 21, 2021. Accessed: May 29, 2021. [Online]. Available: <https://www.gov.uk/government/publications/covid-19-guidance-for-food-businesses/preventing-coronavirus-covid-19-in-food-manufacturing-and-processing-settings-working-and-living-safely>



- [59] U.S. Food and Drug Administration and Occupational Safety and Health Administration, "Employee Health and Food Safety Checklist for Human and Animal Food Operations During the COVID-19 Pandemic," Updated August 11, 2020. Accessed: April 29, 2021. [Online]. Available: <https://www.fda.gov/media/141141/download>
- [60] U.S. Food and Drug Administration and U.S. Department of Agriculture, "Food and Agriculture: Considerations for Prioritization of PPE, Cloth Face Coverings, Disinfectants, and Sanitation Supplies During the COVID-19 Pandemic," May 20, 2020. Accessed: May 30, 2021. [Online]. Available: <https://www.fda.gov/media/138183/download>
- [61] U.S. Food and Drug Administration, "Use of Respirators, Facemasks, and Cloth Face Coverings in the Food and Agriculture Sector During Coronavirus Disease (COVID-19) Pandemic," April 2020. Accessed: April 29, 2021. [Online]. Available: <https://www.fda.gov/media/137327/download>
- [62] U.S. Food and Drug Administration. "What to Do If You Have a COVID-19 Confirmed Positive Worker or Workers Who Have Been Exposed to a Confirmed Case of COVID-19." <https://www.fda.gov/food/food-safety-during-emergencies/what-do-if-you-have-covid-19-confirmed-positive-worker-or-workers-who-have-been-exposed-confirmed> (accessed April 29, 2021).
- [63] U.S. Food and Drug Administration. "COVID-19 Vaccination & the Food and Agriculture Sector." <https://www.fda.gov/food/food-safety-during-emergencies/covid-19-vaccination-food-and-agriculture-sector> (accessed June 5, 2021).
- [64] U.S. Department of Agriculture. "Food Supply Chain." <https://www.usda.gov/coronavirus/food-supply-chain> (accessed April 30, 2021).
- [65] Agriculture and Agri-Food Canada and Public Health Agency of Canada, "Workplace guidance for agriculture and agri-food sector employers and employees," Date modified: March 16, 2021. Accessed: May 3, 2021. [Online]. Available: <https://agriculture.canada.ca/en/covid-19-information-agriculture-and-agri-food-industry/workplace-guidance>
- [66] Agriculture and Agri-Food Canada, "Checklist for the control of COVID-19 in agricultural facilities," Date modified: September 9, 2020. Accessed: May 3, 2021. [Online]. Available: <https://agriculture.canada.ca/en/covid-19-information-agriculture-and-agri-food-industry/workplace-guidance/checklist-control-covid-19-agricultural-facilities>
- [67] Canadian Food Inspection Agency, "CFIA expectations for the prevention of and response to suspect and confirmed cases of COVID-19 by Meat Slaughter and Processing Establishments," Date modified: April 24, 2020. Accessed: May 3, 2021. [Online]. Available: <https://inspection.canada.ca/covid-19/cfia-information-for-industry/cfia-expectations-for-the-prevention-of-and-respon/eng/1585620151816/1585620617343>
- [68] Safe Work Australia, "COVID-19 for Workplaces Pack, For the Worker in the Agriculture industry." Accessed: May 26, 2021. [Online]. Available: <https://www.safeworkaustralia.gov.au/covid-19-print-pack/736/734>

- [69] Safe Work Australia, "COVID-19 for Workplaces Pack, For the Employer in the Agriculture industry." Accessed: May 26, 2021. [Online]. Available: <https://www.safeworkaustralia.gov.au/covid-19-print-pack/736/733>
- [70] Safe Work Australia, "COVID-19 for Workplaces Pack, For the Worker in the Food processing & manufacturing industry." Accessed: May 26, 2021. [Online]. Available: <https://www.safeworkaustralia.gov.au/covid-19-print-pack/753/734>
- [71] Safe Work Australia, "COVID-19 for Workplaces Pack, For the Employer in the Food processing & manufacturing industry." Accessed: May 26, 2021. [Online]. Available: <https://www.safeworkaustralia.gov.au/covid-19-print-pack/753/733#r>
- [72] Ministry for Primary Industries, "COVID-19 and food safety in Alert Level 2," Last reviewed: September 11, 2020. Accessed: May 17, 2021. [Online]. Available: <https://www.mpi.govt.nz/covid-19-information-and-advice/covid-19-and-food-safety/covid-19-and-food-safety-in-alert-level-2/>
- [73] Ministry for Primary Industries, "New Zealand COVID-19, MPI Safety Guidance - Alert Level 2, MPI generic guidance on COVID-19 safety measures for primary industry and food businesses at Alert Level 2," August 28, 2020. Accessed: May 18, 2021. [Online]. Available: <https://www.mpi.govt.nz/dmsdocument/41941-MPI-safety-guidance-for-COVID-19-in-primary-industry-General-AL2-28-Aug-20.pdf>
- [74] Ministry for Primary Industries, "COVID-19 and food safety in Alert Level 3, Advice around food safety and coronavirus and our guidance for food handlers and food businesses during Alert Level 3," Last reviewed: September 12, 2020. Accessed: May 17, 2021. [Online]. Available: <https://www.mpi.govt.nz/covid-19-information-and-advice/covid-19-and-food-safety/covid-19-and-food-safety-in-alert-level-3/>
- [75] Ministry for Primary Industries, "New Zealand COVID-19, MPI Safety Guidance - Alert Level 3, MPI generic guidance on COVID-19 safety measures for primary industry and food businesses at Alert Level 3," August 28, 2020. Accessed: May 18, 2021. [Online]. Available: <https://www.mpi.govt.nz/dmsdocument/41938-MPI-safety-guidance-for-COVID-19-in-primary-industry-General-AL3-28-Aug-20.pdf>
- [76] Ministry for Primary Industries, "New Zealand COVID-19, MPI Safety Guidance - Alert Level 3, MPI guidance on COVID-19 safety measures for New Zealand red meat, poultry meat and seafood processors at Alert Level 3," August 28, 2020. Accessed: May 18, 2021. [Online]. Available: <https://www.mpi.govt.nz/dmsdocument/41944-MPI-safety-guidance-for-COVID-19-in-meat-and-seafood-AL3-28-Aug-20.pdf>
- [77] Ministry for Primary Industries, "Information for fishers during Alert Level 3, Under Level 3, all primary sector businesses and support services can operate, as long as they can operate safely," Last reviewed: September 11, 2020. Accessed: May 18, 2021. [Online]. Available: <https://www.mpi.govt.nz/covid-19-information-and-advice/covid-19-in-the-forestry-industry-2/information-for-fishers-during-alert-level-3/>
- [78] Ministry of Health, Labour and Welfare, "[About basic guidelines for response and business continuity when an employee of a food industry operator is infected with the new coronavirus] - Shokuhin sangyou jigyousha no juugyouin ni shingata korona uirusu kansensha ga hassei shita toki no taiou oyobi jigyoukeizoku ni kansuru kihontekina gaidorain ni tsuite," Mach 16, 2020. Accessed: April 25, 2021. [Online]. Available:

- <https://www.mhlw.go.jp/content/11130500/000609110.pdf>, Retrieved information partially and edited on April 25, 2021, from the Official Website of the Ministry of Health, Labour and Welfare.
- [79] Ministry of Agriculture, Forestry and Fisheries, "[Basic guidelines for response and business continuity when an employee of a food industry operator is infected with the new coronavirus] -Shokuhin sangyou jigyousha no juugyouin ni shingata korona uirusu kansensha ga hassei shita toki no taiou oyobi jigyoukeizoku ni kansuru kihontekina gaidorain." Accessed: May 17, 2021. [Online]. Available: [https://www.maff.go.jp/j/saigai/n\\_coronavirus/pdf/gl\\_syo.pdf](https://www.maff.go.jp/j/saigai/n_coronavirus/pdf/gl_syo.pdf), Retrieved information partially on May 17, 2021, from the Official Website of the Ministry of Agriculture, Forestry and Fisheries ([https://www.maff.go.jp/j/saigai/n\\_coronavirus/ncv\\_guideline.html](https://www.maff.go.jp/j/saigai/n_coronavirus/ncv_guideline.html)), and edited.
- [80] Ministry of Agriculture, Forestry and Fisheries, "[Basic guidelines for response and business continuity when a new coronavirus-infected person occurs in agriculture] - Nougyou ni okeru shingata korona uirusu kansensha ga hassei shita toki no taiou oyobi jigyoukeizoku ni kansuru kihontekina gaidorain." Accessed: April 25, 2021. [Online]. Available: [https://www.maff.go.jp/j/saigai/n\\_coronavirus/pdf/gl\\_nou.pdf](https://www.maff.go.jp/j/saigai/n_coronavirus/pdf/gl_nou.pdf), Retrieved information partially on April 25, 2021, from the Official Website of the the Ministry of Agriculture, Forestry and Fisheries ([https://www.maff.go.jp/j/saigai/n\\_coronavirus/ncv\\_guideline.html](https://www.maff.go.jp/j/saigai/n_coronavirus/ncv_guideline.html)), and edited.
- [81] Ministry of Agriculture, Forestry and Fisheries, "[Basic guidelines for response and business continuity when a new coronavirus-infected person occurs in a livestock operator] - Chikusan jigyousha ni shingata korona uirusu kansensha ga hassei shita toki no taiou oyobi jigyoukeizoku ni kansuru kihontekina gaidorain." Accessed: April 25, 2021. [Online]. Available: [https://www.maff.go.jp/j/saigai/n\\_coronavirus/pdf/gl\\_tik.pdf](https://www.maff.go.jp/j/saigai/n_coronavirus/pdf/gl_tik.pdf), Retrieved information partially on April 25, 2021, from the Official Website of the the Ministry of Agriculture, Forestry and Fisheries ([https://www.maff.go.jp/j/saigai/n\\_coronavirus/ncv\\_guideline.html](https://www.maff.go.jp/j/saigai/n_coronavirus/ncv_guideline.html)), and edited.
- [82] Ministry of Agriculture, Forestry and Fisheries, "[Basic guidelines for response and business continuity when a fisherman is infected with the new coronavirus] -Gyogyousha ni shingata korona uirusu kansensha ga hassei shita toki no taiou oyobi jigyoukeizoku ni kansuru kihontekina gaidorain." Accessed: April 25, 2021. [Online]. Available: [https://www.maff.go.jp/j/saigai/n\\_coronavirus/pdf/gl\\_gyo.pdf](https://www.maff.go.jp/j/saigai/n_coronavirus/pdf/gl_gyo.pdf), Retrieved information partially on April 25, 2021, from the Official Website of the the Ministry of Agriculture, Forestry and Fisheries ([https://www.maff.go.jp/j/saigai/n\\_coronavirus/ncv\\_guideline.html](https://www.maff.go.jp/j/saigai/n_coronavirus/ncv_guideline.html)), and edited.
- [83] Centers for Disease Control and Prevention, "Scientific Brief: SARS-CoV-2 Transmission," Updated May 7, 2021. Accessed: July 11, 2021. [Online]. Available: <https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/sars-cov-2-transmission.html>
- [84] World Health Organization, and International Labour Organization, "Preventing and mitigating COVID-19 at work, Policy brief," May 19, 2021. Accessed: July 11, 2021. [Online]. Available: <https://www.who.int/publications/i/item/WHO-2019-nCoV-workplace-actions-policy-brief-2021-1>

- [85] World Health Organization, "Transmission of SARS CoV-2: implications for infection prevention precautions, Scientific brief," July 9, 2020. Accessed: July 11, 2021. [Online]. Available: <https://apps.who.int/iris/handle/10665/333114>
- [86] Centers for Disease Control and Prevention, "Interim Public Health Recommendations for Fully Vaccinated People," Updated May 28, 2021. Accessed: July 14, 2021. [Online]. Available: <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated-guidance.html>