

# COVID-19 and food safety: guidance for food businesses

Interim guidance  
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## Background

The world is facing an unprecedented threat from the COVID-19 pandemic caused by the SARS-CoV-2 virus (referred to as the COVID-19 virus). Many countries are following the advice from the World Health Organization (WHO) regarding the introduction of physical distancing measures as one of the ways in which transmission of the disease can be reduced.<sup>1</sup> The application of these measures has resulted in the closure of many businesses, schools, and institutes of education, and restrictions on travel and social gatherings. For some people, working from home, teleworking, and on-line or internet discussions and meetings are now normal practices. Food industry personnel, however, do not have the opportunity to work from home and are required to continue to work in their usual workplaces. Keeping all workers in the food production and supply chains healthy and safe is critical to surviving the current pandemic. Maintaining the movement of food along the food chain is an essential function to which all stakeholders along the food chain need to contribute. This is also required to maintain trust and consumer confidence in the safety and availability of food.

The food industry should have Food Safety Management Systems (FSMS) based on the Hazard Analysis and Critical Control Point (HACCP) principles in place to manage food safety risks and prevent food contamination. Food industry FSMS are underpinned by prerequisite programmes that include good hygiene practices, cleaning and sanitation, zoning of processing areas, supplier control, storage, distribution and transport, personnel hygiene and fitness to work – all the basic conditions and activities necessary to maintain a hygienic food processing environment. The Codex General Principles of Food Hygiene<sup>2</sup> lay down a firm foundation for implementing key hygiene controls at each stage of the food processing, manufacture, and marketing chain for the prevention of food contamination.

If a food business has a FSMS and/or HACCP team established, the members of these groups need to be included in all discussions to ensure that new interventions are reviewed with food safety in mind. If a business does not have a FSMS and/or HACCP team established, then it needs to appoint one person responsible for considering whether food safety risks could arise from additional measures. This designated person must liaise with food safety authorities for advice. There is now an urgent requirement for the industry to ensure compliance with measures to protect food workers from contracting COVID-19, to prevent exposure to or transmission of the virus, and to strengthen food hygiene and sanitation practices.

The purpose of these guidelines is to highlight these additional measures so that the integrity of the food chain is maintained, and that adequate and safe food supplies are available for consumers.

## Potential transmission of COVID-19 via food

It is highly unlikely that people can contract COVID-19 from food or food packaging. COVID-19 is a respiratory illness and the primary transmission route is through person-to-person contact and through direct contact with respiratory droplets generated when an infected person coughs or sneezes.

There is no evidence to date of viruses that cause respiratory illnesses being transmitted via food or food packaging. Coronaviruses cannot multiply in food; they need an animal or human host to multiply.

The most recent advice from the WHO<sup>3</sup> is that current evidence indicates that COVID-19 virus is transmitted during close contact through respiratory droplets (formed on coughing or sneezing) and by fomites.<sup>4-10</sup> The virus can spread directly from person-to-person when a COVID-19 case coughs or sneezes, producing droplets that reach the nose, mouth, or eyes of another person. Alternatively, as the respiratory droplets are too heavy to be airborne, they land on objects and surfaces surrounding the infected person. It is possible that someone may become infected by touching a contaminated surface, object, or the hand of an infected person and then touching their own mouth, nose, or eyes. This can happen, for instance, when touching door knobs or shaking hands and then touching the face.

Recent research evaluated the survival of the COVID-19 virus on different surfaces and reported that the virus can remain viable for up to 72 hours on plastic and stainless steel, up to four hours on copper, and up to 24 hours on cardboard.<sup>11</sup> This research was conducted under laboratory conditions (controlled relative humidity and temperature) and should be interpreted with caution in the real-life environment.

It is imperative for the food industry to reinforce personal hygiene measures and provide refresher training on food hygiene principles<sup>2</sup> to eliminate or reduce the risk of food surfaces and food packaging materials becoming contaminated with the virus from food workers. Personal protective equipment (PPE), such as masks and gloves, can be effective in reducing the spread of viruses and disease within the food industry, but only if used properly. In addition, the food industry is strongly advised to introduce physical distancing and stringent hygiene and sanitation measures and

promote frequent and effective handwashing and sanitation at each stage of food processing, manufacture and marketing. These measures will protect staff from spreading COVID-19 among workers, maintain a healthy workforce, and detect and exclude infected food handlers and their immediate contacts from the workplace.

Although COVID-19 genetic material (RNA) has been isolated from stool samples of infected patients,<sup>10</sup> there are no reports or any evidence of faecal-oral transmission. Handwashing after using the toilet is always an essential practice especially when working with food.

## Food workers: awareness of COVID-19 symptoms

For the purpose of this guidance food workers include food handlers, people who directly touch open food as part of their work. It also includes staff who may touch food contact surfaces or other surfaces in rooms where open food is handled. The term can therefore apply to managers, cleaners, maintenance contractors, delivery workers, and food inspectors.

WHO recommends that people who are feeling unwell should stay at home.<sup>12</sup> Staff working in the food sector need to be aware of the symptoms of COVID-19. Food business operators need to produce written guidance for staff on reporting such symptoms and on exclusion from work policies. The most important issue is for staff to be able to recognise symptoms early so that they can seek appropriate medical care and testing, and minimise the risk of infecting fellow workers.

Common symptoms of COVID-19<sup>13</sup> include:

- a fever (high temperature – 37.5 degrees Celsius or above)
- a cough - this can be any kind of cough, not just dry
- shortness of breath
- breathing difficulties
- fatigue

## Food workers: preventing the spread of COVID-19 in the work environment

Staff working in food premises should be provided with written instructions and training on how to prevent the spread of COVID-19. Normal routine fitness to work procedures employed by food businesses as part of their FSMS should ensure that infected workers are excluded from food premises. Staff who are unwell or have symptoms of COVID-19 should not be at work and should be informed about how to contact medical professionals. This is imperative because if an infected worker handles food it is possible that they could introduce virus to the food they are working on, or onto surfaces within the food business, by coughing and sneezing, or through hand contact. In addition, in some cases, infected people may be asymptomatic or pre-symptomatic and may not display any signs or symptoms of disease or may present with mild symptoms that are easily overlooked. Some infected people not yet displaying symptoms have been

shown to be contagious and capable of spreading the virus.<sup>14-19</sup> This underscores the need for all personnel working in the food industry, regardless of their apparent health status, to practice personal hygiene and appropriately use PPE. Food businesses need to introduce a high level of security and staff management to maintain a disease-free working environment.

Prerequisite Programmes must ensure that COVID-19 infected (symptomatic individuals and confirmed asymptomatic carriers) workers and their contacts (those with exposure to confirmed cases) are excluded from food premises. Staff who are unwell or who have any symptoms of COVID-19 should not work. A procedure to allow staff to report illness by phone (or email) should be established so that workers with early stages of COVID-19 can receive reliable information and be quickly excluded from work environments.

Food safety practices in food premises should continue to be delivered to the highest hygiene standards in line with established FSMS.

Good staff hygienic practices include:

- proper hand hygiene – washing with soap and water for at least 20 seconds (follow WHO advice);<sup>20</sup>
- frequent use of alcohol-based hand sanitizers;
- good respiratory hygiene (cover mouth and nose when coughing or sneezing; dispose of tissues and wash hands);
- frequent cleaning/disinfection of work surfaces and touch points such as door handles;
- avoiding close contact with anyone showing symptoms of respiratory illness such as coughing and sneezing.

## Food workers: use of disposable gloves

Gloves may be used by food workers but must be changed frequently and hands must be washed between glove changes and when gloves are removed. Gloves must be changed after carrying out non-food related activities, such as opening/closing doors by hand, and emptying bins. Food workers should be aware that wearing gloves can allow bacteria to build up on the surface of the hands, so handwashing is extremely important when gloves are removed to avoid subsequent contamination of food. Food workers should avoid touching their mouth and eyes when wearing gloves.

Disposable gloves should not be used in the food work environment as a substitute for handwashing. The COVID-19 virus can contaminate disposable gloves in the same way it gets onto workers' hands. Removal of disposable gloves can lead to contamination of hands. Wearing disposable gloves can give a false sense of security and may result in staff not washing hands as frequently as required.

Handwashing is a greater protective barrier to infection than wearing disposable gloves. Food businesses need to ensure that adequate sanitary facilities are provided and ensure that food workers thoroughly and frequently wash their hands. Normal soap and warm running water is adequate for

handwashing. Hand sanitizers can be used as an additional measure but should not replace handwashing.

## Food workers: physical distancing in the work environment

Physical distancing is very important to help slow the spread of COVID-19. This is achieved by minimising contact between potentially infected individuals and healthy individuals. All food businesses should follow physical distancing guidance as far as reasonably possible. WHO guidelines<sup>13</sup> are to maintain at least 1 metre (3 feet) between fellow workers. Where the food production environment makes it difficult to do so, employers need to consider what measures to put in place to protect employees.

Examples of practical measures to adhere to physical distancing guidance in the food-processing environment are to:

- stagger workstations on either side of processing lines so that food workers are not facing one another;
- provide PPE such as face masks, hair nets, disposable gloves, clean overalls, and slip reduction work shoes for staff. The use of PPE would be routine in high-risk areas of food premises that produce ready-to-eat and cooked foods. When staff are dressed in PPE it is possible to reduce distance between workers;
- space out workstations, which may require reduction in the speed of production lines;
- limit the number of staff in a food preparation area at any one time;
- organise staff into working groups or teams to facilitate reduced interaction between groups.

## Food workers: COVID-19 illness in the workplace

The Prerequisite Programmes that underpin a food business FSMS will include guidelines for managing staff sickness in food premises. Included in these guidelines will be instruction for reporting staff sickness and policies for return to work when staff recover from illness. Staff must be trained in the use of and comply with these guidelines and to report illness at the earliest opportunity to prevent the transmission of COVID-19 to fellow workers. Staff management practices (e.g. reporting illness and exclusion of ill workers) will make it unlikely that a food worker will become unwell in the workplace with symptoms of COVID-19. However, it is necessary to develop a plan of action to manage such an event. A more likely occurrence is that a food worker will report illness by telephone. Staff need to be aware that they should not report to work with symptoms of COVID-19 but notify such illness by telephone.

Staff who are feeling unwell should not report to work and seek medical advice. However, in the event that a food worker becomes unwell in the workplace with typical symptoms of COVID-19, they should be removed to an area away from other people. If possible, find a room or area where they can be isolated behind a closed door, such as a staff office. If it is possible to open a window, do so for ventilation.

Arrangements should be made for the unwell employee to be removed quickly from the food premise.

The employee who is unwell should follow national guidelines for reporting cases/suspect cases of COVID-19. While they wait for medical advice or to be sent home, they should avoid any contact with other employees. They should avoid touching people, surfaces, and objects and be advised to cover their mouth and nose with a disposable tissue when they cough or sneeze and put the tissue in a bag or pocket and then dispose of the tissue in a bin with a lid. If they do not have any tissues available, they should cough and sneeze into the crook of their elbow. If they need to go to the bathroom while waiting for medical assistance, they should use a separate bathroom, if available.

All surfaces that the infected employee has come into contact with must be cleaned, including all surfaces and objects visibly contaminated with body fluids/respiratory secretions, and all potentially contaminated high-contact areas such as toilets, door handles, and telephones. Alcohol-based sanitizers/surface disinfectants should be used for cleaning purposes. In general, alcohol-based disinfectants (ethanol, propan-2-ol, propan-1-ol) have been shown to significantly reduce infectivity of enveloped viruses like COVID-19 virus, in concentrations of 70-80%. Common disinfectants with active ingredients based on quaternary ammonium compounds and chlorine would also have virucidal properties. All staff should wash their hands thoroughly for 20 seconds with soap and water after any contact with someone who is unwell with symptoms consistent with coronavirus infection.

If an employee is confirmed to have COVID-19 it will be necessary to notify all close contacts of the infected employee so they too can take measures to minimise further risk of spread. WHO definitions of a contact of a COVID-19 case can be found here.<sup>21</sup> Examples of contacts in the food industry could include any employee who was in face-to-face or physical (i.e. touching) contact; any employee who was within 1 metre with the confirmed case; anyone who has cleaned up any body fluids without adequate PPE (e.g. gloves, overalls, protective clothing); employees in the same working team or work group as the confirmed case, and any employee living in the same household as a confirmed case.

WHO recommends that contacts be quarantined for 14 days from the last point of exposure to the confirmed case.<sup>22</sup> At a minimum, staff who have had close contact with the infected employee should be asked to stay at home for 14 days from the last time they had contact with the confirmed case and practice physical distancing. If they become unwell at any time within their 14-day isolation period and they test positive for COVID-19, they will become a confirmed case, and should be managed as such.<sup>22</sup>

Staff who have not had close contact with the original confirmed case should continue taking the usual precautions and attend work as usual. Organising employees into small teams or workgroups will help to minimise disruption to workforce in the event of an employee reporting sick with symptoms of COVID-19. Closure of the workplace is not recommended.

A return to work policy for staff who have been infected and recovered from COVID-19 should be in place. WHO recommends that a confirmed case could be released from

isolation once their symptoms resolve and they have two negative PCR tests at least 24 hours apart. If testing is not possible, WHO recommends that a confirmed patient can be released from isolation 14 days after symptoms resolve.<sup>23</sup>

## Food workers: transport and delivery of food ingredients and food products

The primary focus of any additional hygiene and sanitation measures implemented by food businesses is on keeping the COVID-19 virus out of their businesses. The virus will enter business premises only when an infected person enters or contaminated products or items are brought into the premises.

Drivers and other staff delivering to food premises should not leave their vehicles during delivery. Drivers should be supplied with an alcohol-based hand sanitizer, a disinfectant, and paper towels. Drivers should use a hand sanitizer before passing delivery documents to food premises staff. Disposable containers and packaging should be used to avoid the need for cleaning of any returns. In the case of reusable containers, appropriate hygiene and sanitation protocols should be implemented.

Drivers delivering to food premises should be aware of the potential risks involved in contact transmission of COVID-19. The virus can be picked up if drivers touch a contaminated surface or shake hands with an infected person with contaminated hands. Surfaces most likely contaminated with the virus include frequent touch surfaces such as steering wheels, door handles, mobile devices, etc. This is why hand hygiene, in conjunction with physical distancing, is of paramount importance and why contact surface sanitation is critical to avoid cross-contamination.

Drivers need to be aware of physical distancing when picking up deliveries and passing deliveries to customers and of the need to maintain a high degree of personal cleanliness and to wear clean protective clothing. Drivers also need to be aware of the need to ensure that all transport containers are kept clean and frequently disinfected, foods must be protected from contamination, and must be separated from other goods that may cause contamination.

## Retail food premises

During the COVID-19 pandemic, the food retail sector faces the greatest challenges in maintaining the highest standards of hygiene, protecting staff from the risk of infection, maintaining physical distancing when dealing with large numbers of customers, remaining open, and ensuring that adequate supplies of foods are available on a daily basis.

Food workers in retail premises are unlikely to contaminate food if they follow standard, good personal hygiene practices that reduce the risk of transmission of most foodborne illnesses. Measures such as frequent handwashing, use of hand sanitizers, use of protective clothing, good respiratory hygiene, will reduce the risk of spreading the disease. Employers should stress the importance of more frequent handwashing and maintaining good hygiene practices, and of

more frequently cleaning and disinfecting surfaces that are touched regularly. Food workers need to be aware of symptoms of COVID-19 and inform their employer and seek medical advice if they think they have symptoms of the disease.

Maintaining physical distancing in retail food premises is critical for reducing the risk of transmission of the disease. Practical measures that may be used by retailers include the following:

- Regulating the numbers of customers who enter the retail store to avoid overcrowding;
- Placing signs at entry points to request customers not to enter the shop if they are unwell or have COVID-19 symptoms;
- Managing queue control consistent with physical distancing advice both inside and outside stores;
- Providing hand sanitizers, spray disinfectants, and disposable paper towels at store entry points;
- Using floor markings inside the retail store to facilitate compliance with the physical distancing, particularly in the most crowded areas, such as serving counters and tills;
- Making regular announcements to remind customers to follow physical distancing advice and clean their hands regularly;
- Introducing plexiglass barriers at tills and counters as an additional level of protection for staff;
- Encouraging the use of contactless payments;
- As consumers increasingly bring their own shopping bags, advice to consumers to clean their shopping bags before every use shall be posted in the food retail premises (shops, outlets, supermarkets).

Minimise the risk of transmitting COVID-19 by identifying high touch points in the retail premises and ensuring these are cleaned and disinfected regularly. Examples of high touch points are shopping trolleys, door handles, and weighing scales for customer use. Actions to be taken include:

- Providing wipes (or other forms of sanitisation) for customers to clean the handles of shopping trolleys and baskets; or assigning staff to disinfect handles of shopping trolleys after each use;
- Washing and frequent sanitizing items such as ladles, tongs, and condiment holders;
- Keeping doors open where possible to minimise contact.

## Open food display in retail premises

Although some consumers perceive there is a risk of COVID-19 infection resulting from open food displays, there is currently no scientific evidence suggesting that food is associated with transmission of the COVID-19 virus. It is important to maintain good hygiene practices around open food displays, such as salad bars, fresh produce displays, and bakery products. Consumers should always be advised to wash fruit and vegetables with potable water before consumption. Both customers and staff should strictly observe good personal hygiene practices at all times around open food areas.

In order to hygienically manage open food displays and to avoid the transmission of COVID-19 through surface contact, food retailers should:

- Maintain frequent washing and sanitizing of all food contact surfaces and utensils;
- Require food service workers to frequently wash hands, and, if using gloves, these must be changed before and after preparing food;
- Require food service workers to frequently clean and sanitise counters, serving utensils and condiment containers;
- Make available hand sanitizer for consumers on their way in and out of the food premises;
- Should consider not openly displaying or selling unwrapped bakery products from self-service counters. Bakery products on open, self-service displays in retail stores should be placed in plastic/cellophane or paper packaging. Where loose bakery products are displayed in retail stores, these should be placed in plexiglass display cabinets and placed in bags using tongs when customers are served.

## Food workers: staff canteens

Workplace canteens in essential frontline services, such as food processing and food retailing, need to remain open where there are no practical alternatives for staff to obtain food. High standards of the public health measures for handwashing and respiratory etiquette need to be maintained in work canteens. Operational standards staff canteens should include:

- Maintaining a physical distance of at least 1 metre between an individual and other workers, including in seating arrangements;
- Staggering staff work and break times to reduce staff numbers in a canteen at any one time;
- Restricting non-essential physical contact as much as possible;
- Visible notices for staff promoting hand hygiene and physical distancing;
- Cleaning and disinfection procedures for equipment, premises, contact surfaces/ high touch points, e.g. counter tops/tongs/service utensils/open self-service displays/door handles.

WHO continues to monitor the situation closely for any changes that may affect this interim guidance. Should any factors change, WHO will issue a further update. Otherwise, this interim guidance document will expire 2 years after the date of publication.

## References

1. Critical preparedness, readiness and response actions for COVID-19: Interim guidance 19 March 2020 <https://www.who.int/publications-detail/critical-preparedness-readiness-and-response-actions-for-covid-19>
2. Codex Alimentarius. Food hygiene: Basic texts <http://www.fao.org/3/a1552e/a1552e00.pdf>
3. Coronavirus disease 2019 (COVID-19) Situation Report – 66 [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200326-sitrep-66-covid-19.pdf?sfvrsn=81b94e61\\_2](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200326-sitrep-66-covid-19.pdf?sfvrsn=81b94e61_2)
4. Liu J, Liao X, Qian S et al. Community transmission of severe acute respiratory syndrome coronavirus 2, Shenzhen, China, 2020. *Emerg Infect Dis* 2020 doi.org/10.3201/eid2606.200239
5. Chan J, Yuan S, Kok K et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *Lancet* 2020 doi: 10.1016/S0140-6736(20)30154-9
6. Li Q, Guan X, Wu P, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med* 2020; doi:10.1056/NEJMoa2001316.
7. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020; 395: 497–506.
8. Burke RM, Midgley CM, Dratch A, Fenstersheib M, Haupt T, Holshue M, et al. Active monitoring of persons exposed to patients with confirmed COVID-19 — United States, January–February 2020. *MMWR Morb Mortal Wkly Rep.* 2020 doi : 10.15585/mmwr.mm6909e1external icon
9. World Health Organization. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19) 16-24 February 2020 [Internet]. Geneva: World Health Organization; 2020 Available from: <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>
10. Ong SW, Tan YK, Chia PY, Lee TH, Ng OT, Wong MS, et al. Air, surface environmental, and personal protective equipment contamination by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from a symptomatic patient. *JAMA.* 2020 Mar 4 [Epub ahead of print].
11. van Doremalen N, Bushmaker T, Morris DH et al. Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1. *N Engl J Med.* 2020 Mar 17. doi: 10.1056/NEJMc2004973
12. Coronavirus disease (COVID-19) advice for the public. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>
13. Q&A on coronaviruses (COVID-19) <https://www.who.int/news-room/q-a-detail/q-a-coronaviruses>
14. Yu P, Zhu J, Zhang Z, Han Y. A familial cluster of infection associated with the 2019 novel coronavirus indicating possible person-to-person transmission during the incubation period. *J Infect* 2020 doi: 10.1093/jiaa077

15. Huang R, Xia J, Chen Y, Shan C, Wu C. A family cluster of SARS-CoV-2 infection involving 11 patients in Nanjing, China Lancet Infect Dis 2020 doi: 10.1016/ S1473-3099(20)30147-X
16. Pan X, Chen D, Xia Y et al. Asymptomatic cases in a family cluster with SARS-CoV-2 infection. Lancet Infect Dis 2020 doi : 10.1016/ S1473-3099(20)30114-6
17. Tong Z-D, Tang A, Li K-F, Li P, Wang H-L, Yi J-P, et al. Potential presymptomatic transmission of SARS-CoV-2, Zhejiang Province, China, 2020. Emerg Infect Dis. 2020 doi : 10.3201/eid2605.200198
18. Wei WE, Li Z, Chiew CJ, Yong SE, et al. Presymptomatic Transmission of SARS-CoV-2 — Singapore, January 23–March 16, 2020. MMWR, 1 April 2020/69.
19. Kimball A, Hatfield KM, Arons M, James A, et al. Asymptomatic and Presymptomatic SARS-CoV-2 Infections in Residents of a Long-Term Care Skilled Nursing Facility — King County, Washington, March 2020. MMWR, 3 April 2020, 69(13);377–381.
20. Infection prevention and control SAVE LIVES: Clean Your Hands <https://www.who.int/infection-prevention/campaigns/clean-hands/en/>
21. Global Surveillance for human infection with coronavirus disease (COVID-19) [https://www.who.int/publications-detail/global-surveillance-for-human-infection-with-novel-coronavirus-\(2019-ncov\)](https://www.who.int/publications-detail/global-surveillance-for-human-infection-with-novel-coronavirus-(2019-ncov))
22. Considerations in the investigation of cases and clusters of COVID-19 <https://www.who.int/publications-detail/considerations-in-the-investigation-of-cases-and-clusters-of-covid-19>
23. Home care for patients with COVID-19 presenting with mild symptoms and management of their contacts [https://www.who.int/publications-detail/home-care-for-patients-with-suspected-novel-coronavirus-\(ncov\)-infection-presenting-with-mild-symptoms-and-management-of-contacts](https://www.who.int/publications-detail/home-care-for-patients-with-suspected-novel-coronavirus-(ncov)-infection-presenting-with-mild-symptoms-and-management-of-contacts)

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