



The SARS-CoV-2 (Coronavirus) and COVID-19 Disease

**Understanding risk, impact and how to prepare against infections
(extended full text version)**

February 2020

Outbreak Overview



Peter J. Teska

BS, MBA, DrPH candidate

Diversey's Global Infection Prevention
Application Expert





Overview of the outbreak

- In Nov/Dec 2019, an outbreak of a novel coronavirus in Wuhan China originally infected 40+ people, most of whom developed pneumonia and had contact with the same seafood market in Wuhan China.
- It is not clear how many people were initially infected because the virus causing the outbreak was novel (not previously identified) and thus difficult to diagnose.
- The virus has since been identified as a coronavirus (CoV) and has been named SARS-CoV-2 with the associated disease being called COVID-19.
- SARS-CoV-2 is 80%+ genetically similar to the SARS-CoV from the 2002/2003 outbreak.
- Because SARS-CoV-2 is novel, many of the potential risks associated with the virus are unclear.
- As of mid Feb, more than 75,000 people have been infected globally with ~2,000 deaths (~2.5% mortality). 98%+ of cases occurred in China, but 25 countries have cases of infected people.
- This presentation summarizes what is known about the outbreak and shares infection prevention practices likely to help prevent human infection.

Johns Hopkins outbreak case tracking map can be viewed [HERE](#)





Wuhan China outbreak

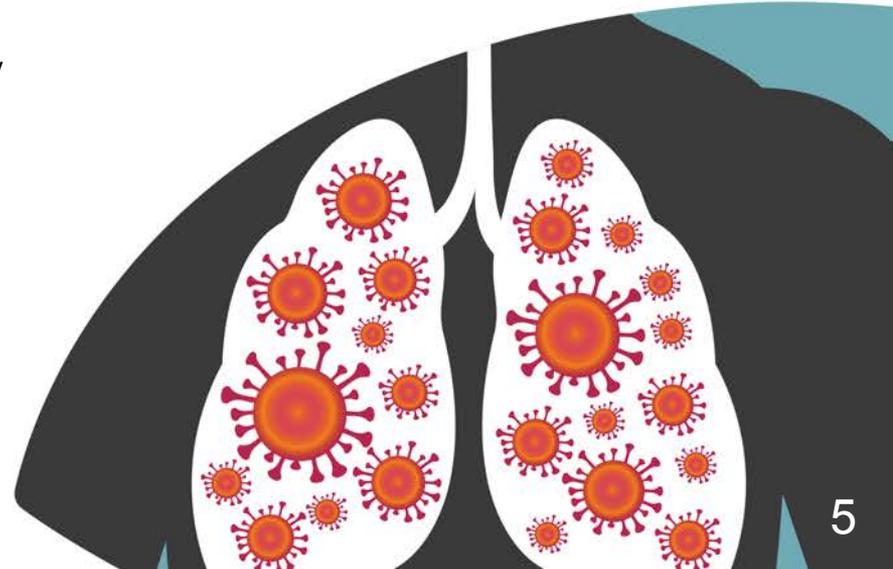
- More than 11 million people live in Wuhan China, and many shop in the open air markets in the city.
- The seafood market where the outbreak started sells seafood, but also chickens, bats, civet cats, marmots, snakes, and other wild game animals.
- It is believed the virus was initially zoonotic. This means animal to human transmission caused the outbreak by spreading the virus from some group of animals to people.
- It is not known for certain which animal(s) are the cause of the outbreak, but coronaviruses are very common in bats and horseshoe bats were being sold in the market.
- Bats can spread viruses to other animals and infected animals are not likely to show symptoms of being infected. Contact with the animal and its secretions/bodily fluids could pass the virus to people.
- While not initially detected, person to person transmission has since been proven and is responsible for most/all of the cases after the initial transmission event.





Coronaviruses

- Coronaviruses (CoV) are a broad family of viruses named after the crown-like spikes on their surface. These viruses can be found in people and animals.
- CoV typically cause mild to moderate upper respiratory tract disease in humans, but can also cause more severe infections such as pneumonia.
- Mild illness caused by CoV includes the common cold and influenza-like illness. Severe illness caused by CoV includes Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS), and certain pneumonias.
- There are some coronaviruses that can be transmitted from animals to people. Both the SARS-CoV and MERS-CoV are believed to have originated in animals and were transmitted to people, causing infection.
- The virus was initially identified as 2019-nCoV because it is novel, but since has been found to be very similar to the SARS CoV that caused the 2002/2003 outbreak and is now called SARS-CoV-2.
- The disease caused by the SARS-CoV-2 is called COVID-19. You may see both names in the media.





Diagnosis & symptoms of infection

- For coronaviruses, the incubation period is 2-11 days for the development of symptoms, suggesting people exposed to CoV may rapidly present symptoms of infection after exposure to the virus, but it may take up 2 weeks to show symptoms, and in rare cases, even longer.
- There is some evidence people can pass the virus without being symptomatic or with only mild symptoms. More on this later.
- The symptoms likely to present early in the illness are often seen in patients with more commonly occurring diseases, such as the common cold, and influenza-like illness, or even other CoV infections.
- High fever (101F/38.3C), cough, and breathing difficulties are likely to be in the initial symptoms when infected.
- Diagnosis and treatment of CoVID-19 should only be performed by a trained physician who can rule out other potential diseases.
- Of those infected, many/most have had mild symptoms, which may resemble influenza-like illness.
- 10-20% of those infected have developed pneumonia, many requiring hospitalization and ~2.5% have died from the disease.



The incubation period is 1-14 days, but can be longer in rare cases. People are most contagious when showing symptoms.

SYMPTOMS

- High fever (over 101F or 38.3C)
- Cough
- Breathing difficulties





Method of transmission

- SARS-CoV-2 was likely transmitted from bats to other animal(s) to people.



- How SARS-CoV-2 spreads from person to person?



Person to person transmission



By droplets

Made when infected people cough, sneeze or talk



Touching

Contaminated objects or surfaces





- SARS-CoV-2 was likely transmitted from bats to other animal(s) to people.
- The mechanism of transmission from animals to people appears to be inefficient or more people would have been infected in the current outbreak.
- Those people initially infected likely had direct contact with infected animals or their bodily fluids/secretions or undercooked meat containing the virus, resulting in acquisition of the virus.
- People infected with the virus may cough or sneeze contaminated bioaerosols (small droplets) into the air that may travel up to 2 meters (6 feet).
- Inhalation or swallowing of these bioaerosol droplets likely caused person to person infection.
- If the contaminated droplets settle onto people or their clothing, the person may touch the droplets and then their eyes/mouth/nose, resulting in infection.





Coronaviruses on surfaces

- If contaminated bioaerosol droplets settle onto surfaces, people may touch the surfaces and contaminate their hands and then touch their eyes/mouth/nose, resulting in infection.
- Coronaviruses can live on environmental surfaces from a few hours to a few days, with a recent literature review suggesting coronaviruses may survive up to 9 days on environmental surfaces (Kampf, 2020).
- After the outbreak started, the market was closed by the China government.
- Samples from a number of surfaces in the seafood market tested positive for the RNA of the SARS-CoV-2, indicating the source of the outbreak was likely the wild game area.



Editorial credit: sleepingpawla / Shutterstock.com



Person to person transmission risk

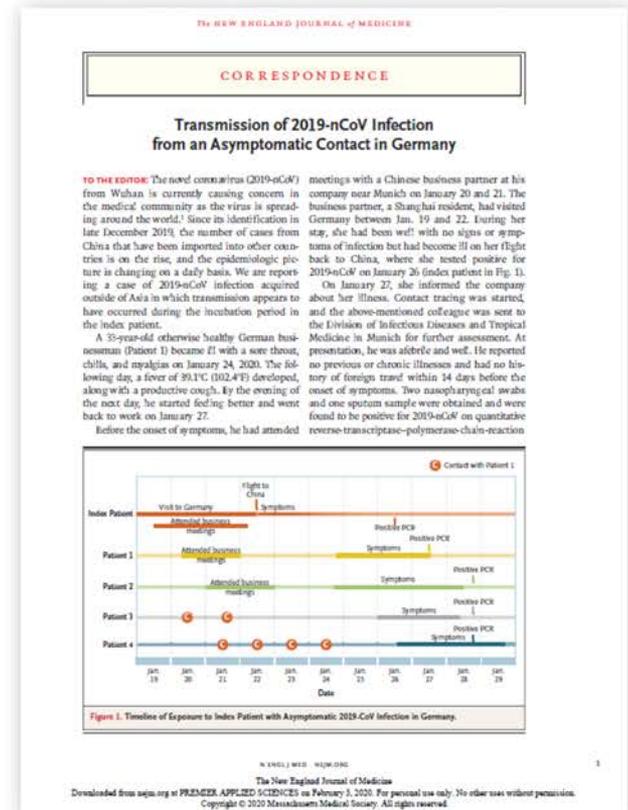
- When person to person transmission occurs, it is most likely where there is close personal contact with a person that is visibly sick. Typically asymptomatic people (those without symptoms) are at low risk of spreading viruses to others.
- Casual contact in the public with an infected person is unlikely to result in transmission unless contact with contaminated body fluids occurs, such as from coughing and sneezing.
- Both SARS and MERS are spread by droplet transmission. In droplet transmission, infected droplets of liquid are discharged from the infected person (such as by coughing and sneezing) and travel 1-2 meters before rapidly settling onto surfaces.
- The droplets are not carried on air currents over a larger area, minimizing the risk of ongoing transmission.
- When the method of transmission for a pathogen is not well understood, the WHO and US-CDC recommend additional caution for healthcare workers when in close contact or when treating symptomatic patients.





Confusion on person to person transmission risk

- A report from several German doctors (Rothe et. al.) was published in the New England Journal of Medicine on Jan 30th 2020.
- The report claimed that asymptomatic transmission was possible, which would indicate that people could get infected from people not showing symptoms. This was widely reported in the media.
- However the doctors did **not** interview the person known to be infected (primary case), but relied on the memories of those in contact with the infected person to determine whether the primary case was symptomatic.
- Follow-up with the primary case determined she was symptomatic but was taking medicine to reduce the intensity of symptoms, making the symptoms less visible to others. People taking medicine to reduce their symptoms are sick and may pose a significant risk because they may resume normal life activities, putting others at risk.
- Anyone with a fever should avoid normal activities for at least 24 hours after fever subsides. Taking medicine to reduce the fever does not mean a person does not have a fever. A person should be without fever or from taking fever reducing medicine for 24 hours before returning to normal activities.





Best practices to reduce infection risk

- Monitor official channels for health information (e.g. WHO, CDC).
- Observe good infection prevention practices, especially in public buildings.
- People who are sick with symptoms of COVID-19 or other influenza-like illness should wear masks in public to protect others.

Know your novel coronavirus facts



Read our educational & procedural information.

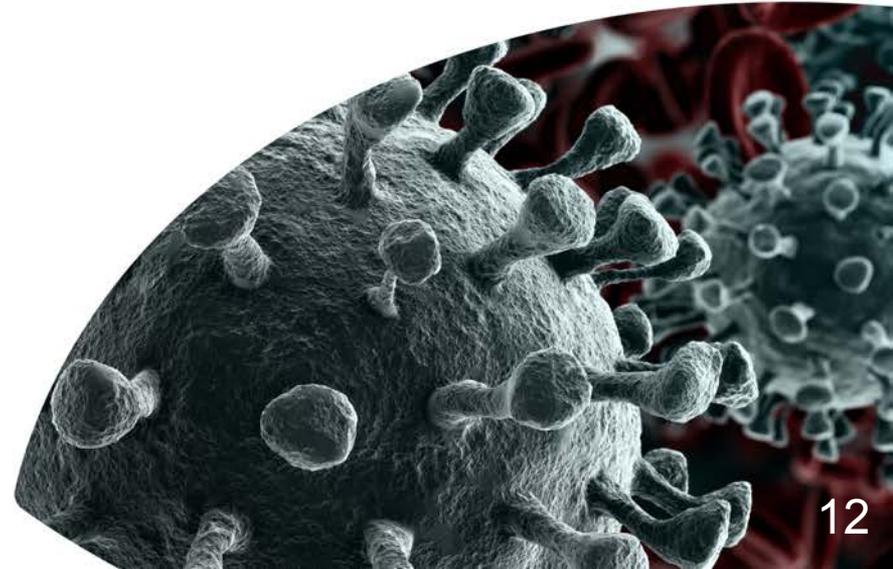


People with novel coronavirus should not prepare food or serve beverages for others until their symptoms have resolved.



Encourage employees to:

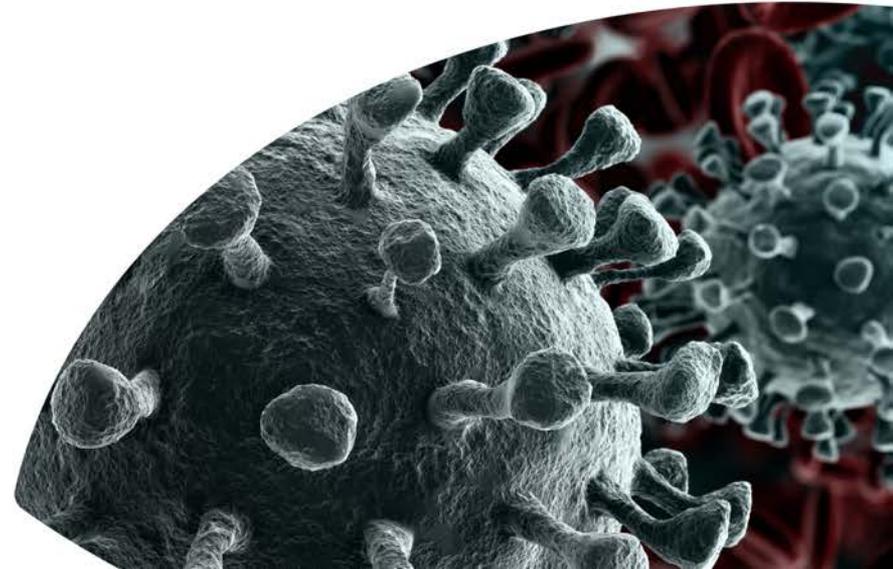
- Visit doctor if sick
- Perform hand hygiene routinely
- Clean and disinfect impacted area





Best practices to reduce infection risk

- Monitor official channels for health information, such as the WHO, CDC, and other governmental websites in your country. Twitter, Facebook, and other social media should be read with extreme caution.
- Observe good infection prevention practices, especially in public buildings, including hand hygiene, surface cleaning and disinfection, respiratory hygiene, the use of personal protective equipment (where appropriate), and social distancing.
- Wearing of surgical masks in public is controversial as it only minimally reduces the infection risk for healthy people and depletes critical supplies needed by healthcare staff.
- People who are sick with symptoms of COVID-19 or other influenza-like illness should wear masks in public to protect others.





Best practices to reduce infection risk

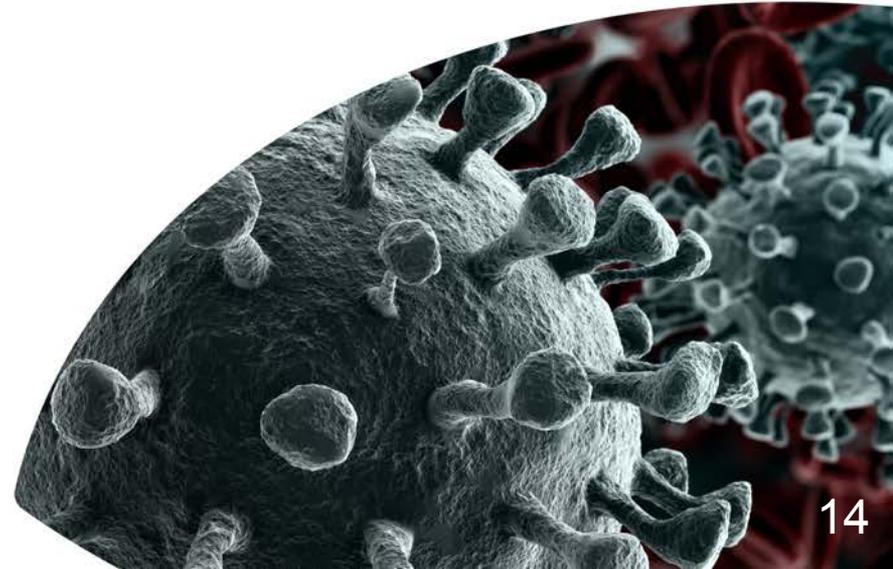


In China...

- Avoid areas where the outbreak occurred until notified that it is safe to reenter.
- Minimize direct contact and/or prolonged contact with animals (or uncooked meat) that may carry the virus.

Have you travelled recently to China?

- *If so, and if you develop symptoms of fever, cough, and trouble breathing within 2 weeks of travel, contact your healthcare provider immediately and don a surgical mask on entering a healthcare facility. Make sure your healthcare provider knows of the recent travel to China.*





Prevention Practices for Workers Handling Animals

Workers that handle living or dead animals should:

- Use protective clothing, gloves, and masks when handling feed, water, feces, or in close contact with the animals. They should wash clothing after contact with animals and change clothing each day.
- Perform frequent hand hygiene through the day, especially when entering and leaving animal housing areas. Hand hygiene should be performed after sneezing or coughing.
- Workers should avoid touching their face, mouth, eyes, and nose, especially when around animals.
- Standard cleaning and disinfection practices are effective and can help prevent the spread of coronaviruses, including SARS-CoV-2.



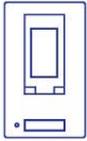


Prevention practices for the general public

Prevention



- Observe good infection prevention practices to minimise risk when handling, housing and transferring animals
- Minimise direct or prolonged contact with sick people and animals
- Wear protective clothing when in contact with animals and infected people
- CoV are easily killed on environmental surfaces so disinfect frequently touched surfaces often using a healthcare grade disinfectant such as Oxivir



Sanitize hands using alcohol based hand rub

Use alcohol hand rub unless hands are visibly soiled.

Or



Frequent handwashing

Wash hands with soap and water for at least 20 seconds.



Cover your mouth and nose

With a tissue or sleeve when coughing, sneezing and preparing & cooking food.



Avoid close contact

With anyone showing symptoms of respiratory illness.

Find ally in 0.5% Hydrogen Peroxide disinfectants:

• *Cleaning and disinfection of environmental surfaces in public buildings can help reduce the risk of transmission of SARS-CoV-2 and other pathogens that can cause disease. Kampf (2020) states that 1000 ppm chlorine or 0.5% hydrogen peroxide have been shown to be effective against coronaviruses.*





Prevention practices for the general public

- Frequent **hand hygiene** is the single best way to prevent many diseases and is very helpful in preventing infection and diseases such as COVID-19.
- Handwashing should be performed whenever hands are visibly soiled. Alcohol hand rubs with 60-70%+ alcohol will be effective against the virus.
- Avoid or minimize **contact with sick people**, especially those with influenza-like (respiratory) infections. People who are already sick with a cold or influenza-like symptoms should stay home for at least 24 hours after their fever subsides or wear a mask if they need to travel in public to protect others.
- **Cleaning and disinfection** of environmental surfaces in public buildings can help reduce the risk of transmission of SARS-CoV-2 and other pathogens that can cause disease. Kampf (2020) states that 1000 ppm chlorine or 0.5% hydrogen peroxide have been shown to be effective against coronaviruses.
- Healthcare grade disinfectants will generally be efficacious against the virus, but consult your local department of health or disinfectant manufacturers recommendations in your country for a list of disinfectants effective against SARS-CoV-2.





Prevention practices for healthcare staff

- Observe standard, contact and droplet precautions.



Use proper personal protective equipment including gloves, gowns, eye protection and masks and where needed, N-95 respirators (or equivalent).

Frequent cleaning and disinfection of environmental surfaces and patient care equipment.

Frequent hand hygiene using the WHO 5 Moments of hand hygiene model.

- Staff should be prepared to identify and isolate people that may be carrying the SARS-CoV-2 (coronavirus).
- Fabrics that may be soiled from contact with infected patients should be handled with minimal agitation and laundered using recommended laundering practices (more to follow later)
- Follow good respiratory hygiene practices.





Prevention practices for healthcare staff

- Observe standard, contact and droplet precautions.
- Use proper personal protective equipment including gloves, gowns, eye protection and masks and where needed, N-95 respirators (or equivalent).
- Frequent cleaning and disinfection of environmental surfaces and patient care equipment.
- Frequent hand hygiene using the WHO 5 Moments of hand hygiene model.
- People infected with COVID-19 may seek treatment through a hospital's emergency room. Staff should be prepared to identify and isolate people that may be carrying the SARS-CoV-2 (coronavirus).
- Fabrics that may be soiled from contact with infected patients should be handled with minimal agitation and laundered using standard laundering practices.
- Follow good respiratory hygiene practices.





Prevention practices for public facilities

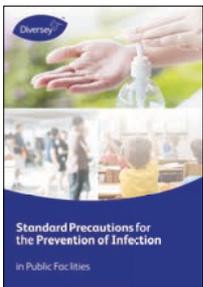
- Outbreaks should generally not change ongoing infection prevention practices for staff. Frequency of practices may increase, but the practices should not need to change.
- Increase access to hand hygiene, disinfectant wipes, and facial tissues can help reduce the risk of infection and provide visual commitment to public safety.
- Consider additional infection prevention practices in transportation vehicles in order to minimize the higher risk for infected people being in close contact with others.
- Packages coming from China are low risk as the virus is unlikely to survive shipment.





Outbreak readiness tools for public facilities

Diversey publishes a wide range of documents to help facilities prepare for outbreaks, which can be downloaded from the Diversey website (<https://diversey.com/en/solutions/infection-prevention/outbreak-prevention/2019-novel-coronavirus>). For more information please contact your local Diversey representative.



IP Public Facilities white paper



Outbreak Prevention



Hand Hygiene awareness



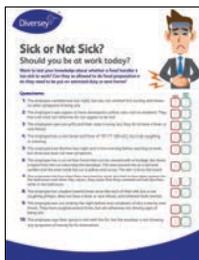
Best practice on cleaning & disinfection guidelines



Blood/Body Fluid Cleanup



Sick Worker Flyers



Preventing Influenza-like Illness



Proper hand hygiene

Special Considerations for Foodservice





Prevention in Food Settings

- **An infected food handler may be at risk of contaminating food they are preparing**
- **Sick employees should stay home**
 - This is a general best practice for kitchens but is especially important for this virus as it is likely transferred directly from person to person.
 - Notify your supervisor if you have a family member at home that has COVID-19.
- **Practice good “Respiratory Etiquette”**
 - Cover your nose and mouth with a tissue when you cough or sneeze then throw the tissue in the trash and perform hand hygiene.
- **Wash your hands (A LOT AND WELL!)**
 - After you sneeze or cough
 - After touching your nose or mouth
 - After using the toilet
 - Before eating
 - Anytime your hands are visibly soiled
 - Wash your hands with soap and water for at least 20 seconds (Recite the alphabet while washing). Rinse your hands with potable water and dry them with a clean or a disposable towel.
 - If water is not available use a hand sanitizer with >60% alcohol.



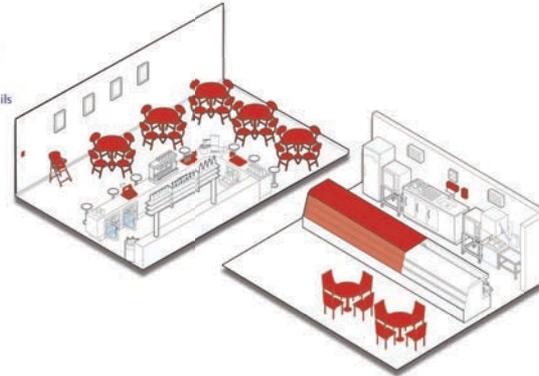
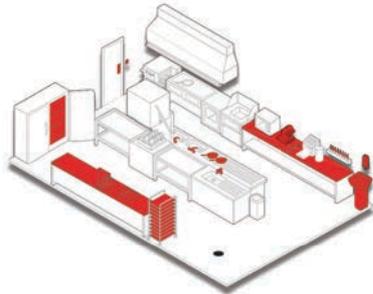


- **Practice good environmental hygiene**
 - Clean surfaces regularly
 - Disinfecting wipes should be available to wipe common touch surfaces (handles, cash registers, shopping carts, keyboards, etc.) down regularly
 - Disinfect surfaces with an appropriate disinfectant that is effective against the SARS-CoV-2 (coronavirus)
 - Note that for North America and other regions, food contact surfaces must be rinsed after they are disinfected and then sanitized with a food contact surface sanitizer
- **Ensure that warewashing processes are being performed correctly**
 - Manual Warewashing: check the chemical concentration for the sanitizing/disinfecting process
 - Low Temp Machine Warewashing: Check the chlorine levels and machine wash temperatures
 - High Temp Machine Warewashing: Check that the correct final rinse and machine wash temperatures are being used.
 - Whatever the process make sure that the contact times being followed to ensure proper inactivation of microorganisms.
- **Ensure that you comply with all food safety practices such as time and temperature cooking, food holding requirements, and care with ready-to-eat foods.**





Prevention in Food Settings



- **Practice good environmental hygiene**
 - Clean surfaces regularly
 - Disinfect surfaces with an appropriate disinfectant that is effective against the SARS-CoV-2 (coronavirus)
- **Ensure that warewashing processes are being performed correctly**
 - Manual Warewashing: check the chemical concentration for the sanitizing/disinfecting process
 - Low Temp Machine Warewashing: Check the chlorine levels and machine wash temperatures
 - High Temp Machine Warewashing: Check that the correct final rinse and machine wash temperatures are being used.
 - Whatever the process make sure that the contact times being followed to ensure proper inactivation of microorganisms.
- **Ensure that you comply with all food safety practices such as time and temperature cooking, food holding requirements, and care with ready-to-eat foods.**

Special Considerations for Fabric Care



Sylvia Heuvel

Global Fabric Care Application Expert

Leader Institute for Textile Research – NL



Recommendations for laundry in case of an outbreak

- 1) For handling and sorting of linen, follow the CDC guidelines*
- 2) For the laundry process itself, the preferred option is to apply thermal disinfection in line with local regulations. These differ by country, but the safest recommendations are:
 - Thermal process 1: 85 °C for 15 minutes
 - Thermal process 2: 90 °C for 10 minutes
 - Thermal process 3: 70 °C for 25 minutes**

For wash classifications requiring special treatment, we have developed dedicated programs in line with above guidelines.

Alternatively, use a chemo-thermal wash process that follows the CDC guidelines*, or use a chemo-thermal process with a locally authorized disinfectant (sanitizer), applied according to the recommended wash process

* Recommendations from [CDC](https://www.cdc.gov) (Center for Disease Control and Prevention)

** Recommendations from [WHO](https://www.who.int) (World Health Organisation)

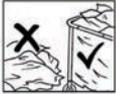




General Good Laundry Practices

1. Collection/Transport/Sorting

- Wear protective clothing during sorting to minimize the risk of contamination
- Always follow the Care Label instructions
- Sort the linen according to its fabric, soil type, soiling level and colour into marked bins/containers
- Avoid contamination by making sure that the clean linen is separated from the linen to be washed



- Use a trolley to transport linen within the laundry and avoid dragging the linen across the floor
- Wash hands after sorting

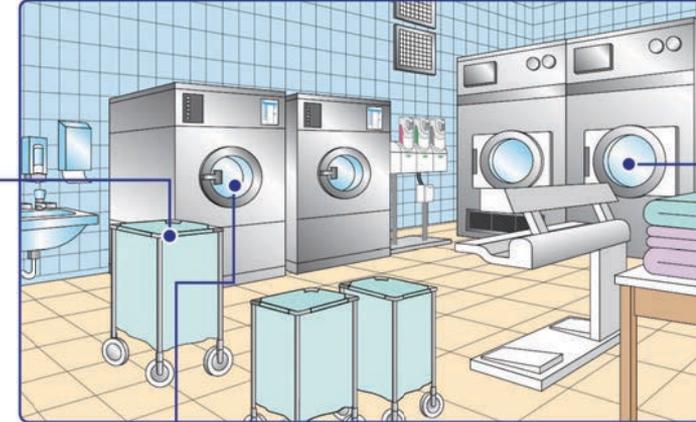
2. Loading/Washing



- Properly load the machine
- Over-loading reduces mechanical action and has many adverse effects on the wash results and the ironing process
- Under-loading increases agitation level, and thereby reduces linen life time; under loading also reduces production efficiency



- Use weighing scale or piece count method for properly loading machines



- Select correct wash programme on machine for each classification – this is very important to achieve the required results and to reduce the need for re-washing
- Start the machine
- Cleaning chemicals will be dispensed automatically and accurately during the correct step of the wash cycle

3. Unloading/Finishing



- Unload clean linen into CLEAN linen trolleys / bins
- If items are still badly stained after washing then they should be re-washed. Putting them in the dryer 'fixes' the stain and makes it more difficult to remove in the future. Follow the proper re-wash procedure
- It is critical to follow the manufacturer's recommendation for the correct drying temperature setting as indicated on the Care Label

4. Quality and Safety

- The washing and finishing quality will be affected by how well the laundry equipment is maintained and cleaned. Preventative maintenance will improve efficiencies



- Clean the lint filters daily; this mandatory practice is essential to reduce the possibility of a fire in the linen room and to allow consistent air flow



- Hot linen must never be left in dryers or laundry trolleys, as this can lead to spontaneous combustion

- Regularly check chemical supplies to make sure that each container has sufficient chemicals left
- Do not alter wash process cycles, nor stop the wash cycle before it is fully completed. This could damage linen and lead to poor results

- Over-loading the dryer may cause wrinkling and can increase the drying time
- If the linen does not tumble correctly, then drying time will be extended
- Always remove lines from the dryer when it has stopped
- The longer linen stays in the dryer, the higher the chance that creasing will occur



- Do not over-dry items, as this can cause shrinkage, greying and a harsh feel
- Ensure the linen has the right moisture retention when ironing

Special Considerations for Public Buildings





Safe Buildings Program

In all areas that you clean and sanitize, pay attention to standard operating procedures, using recommended products only.

Specific attention should be paid to hand hygiene and frequently-touched hard surfaces to avoid cross-contamination.

Cleaning and sanitation will reduce the risk of an outbreak.



1. Maintain excellent hand hygiene
2. Use a disinfectant for targeted disinfection of frequently touched surfaces
3. Deal with blood or other bodily fluid spillages immediately

High risk areas

High risk infection areas need to be cleaned on a regular basis.

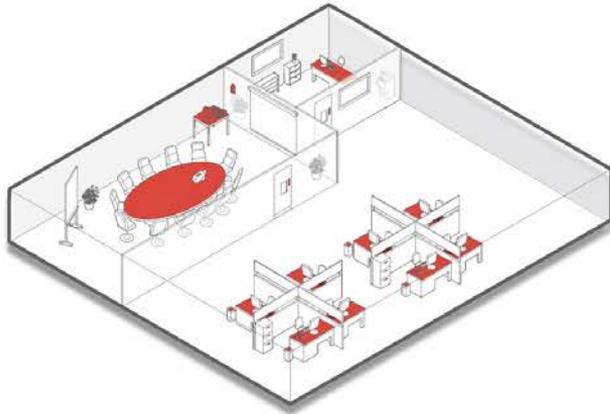
These include areas where traffic is high, bodily spills are frequent or where there is general low level of hygiene.





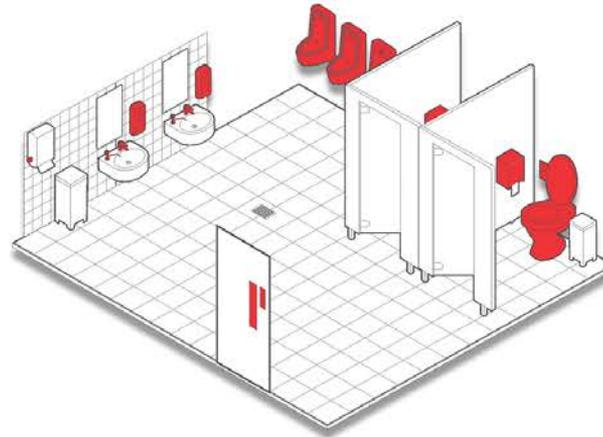
Safe Buildings Program

Key touch points



Offices:

-  telephones
-  desks
-  switches
-  door handles



Washrooms:

-  door handles
-  switches
-  dispensers (loaded, in good order, clean)
-  bathroom handles, toilet flush, shower control, taps
-  toilet seats, splash walls



Key focus areas during an outbreak

1. Apply correct hand hygiene methods

Hand Washing



Hand Rubbing



Ensure availability of stock supplies and keep dispensers full, clean and in a working condition

3. Clean up blood and other body spillages

Please use standard operating procedures.
If absent use this general advice instead.



Small spills with wipe or similar

Big spills with absorbent granules

2. Clean and disinfect surfaces according to your SOP's.



Use approved products with the correct dosing for disinfection of hard surfaces

Use the relevant Mini Guides for the recommended product in your country for how to use on surfaces

Special Considerations for Food and Beverage Processing Plants





Food and Beverage Processing Plants

Reducing the risk to your employees, contractors and visitors is critical to maintaining production during any outbreak

Hand Hygiene

- Comprehensive hand hygiene procedures should already be in place within your facility
- Ensure procedures are followed and reiterate training when required
- Make sure hand rub, depending on the region known as hand sanitizer or hand disinfectant is available in key contact areas not just entry and exit of the production environment





Food and Beverage Processing Plants

Production Areas

- Continue to follow your current GMPs and cleaning procedures for your production areas
- Use an approved disinfectant for targeted disinfection of contact surfaces as per your standard operating procedures
- Pay additional attention to open plant cleaning and ensure the current chemical and process is being followed in accordance with your existing procedures
- Reiterate training when required

Non Production Areas

- High traffic areas should be cleaned on a regular basis – changing rooms, toilets, food preparation areas
- Ensure hand hygiene is performed regularly and hand rub is available

Preventing the spread of infection

- Employees who are unwell should stay at home to avoid person to person transfer
- Employees should notify their supervisor if they have a family member at home that has COVID-19
- Make sure hand rub is available in labour intensive areas





For more information, contact your local sales representative or [click here](#) to contact our customer service team