Workplace Return

April 24th, 2020

This document is intended to provide general insight and best practices rather than specific, customized client advice. Further, this document does not constitute legal advice. Employers should engage their own legal counsel to ensure all adopted recommendations are compliant with applicable laws in their jurisdictions, particularly with respect to collection and use of employee health data.
COVID-19 is, first and foremost, a global humanitarian challenge.

Thousands of health professionals are heroically battling the virus, putting their own lives at risk. Governments and industry are working together to understand and address the challenge, support victims and their families and communities, and search for treatments and a vaccine.

Companies around the world need to act promptly.

This document is meant to help senior leaders understand the COVID-19 situation and how it may unfold, and take steps to protect their employees, customers, supply chains, and financial results.
This document reflects a database of interventions that have been used in industry, and have worked for companies around the globe across manufacturing, retail, office and field environments.

This document is meant to provide visibility on the measures different organizations are taking to ensure protection across the workforce journey.

This document is NOT meant to represent vetted McKinsey recommendation or guidance on best-practices.

Organizations should ensure that all local regulations, and country specific circumstances are taken into account before considering implementation of specific interventions.
This document compiles ~75 interventions for workforce protection during Return.

~75 interventions used worldwide, across 8 levers of protection,

5 phases of the workforce journey, and 4 Environments (office, retail, field, manufacturing)
How to consider transition: Ensuring protection across workforce journey

Workforce protection interventions across manufacturing, office, retail and field environments

Pre-entry
- Policy and education
- Workforce communication

Travel to work
- Public, employer-sponsored and individual transport
- Entrance controls

At work
- Manufacturing environment
- Office environment
- Retail environment
- Field environment

Common spaces
- Meeting rooms
- Break rooms
- Hallways
- Restrooms
- Other

Post-infection
- Isolation
- Tracing & isolation
- Facility response
- Insurance
- Liability

Separate in space & time

Drive safe behavior norms

Use protective equipment

Test & isolate

Increase awareness

Clean & disinfect

Upgrade equipment

Insure & respond
## Initiative tracker across the workforce journey

### Travel to work
<table>
<thead>
<tr>
<th>Pre-entry &amp; time</th>
<th>At work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separate in space &amp; time</td>
<td>Drive safe behavior norms</td>
</tr>
<tr>
<td>Increase safety protocol</td>
<td>Stagger work shifts</td>
</tr>
<tr>
<td>Use private transport</td>
<td>Physical separation of workstations</td>
</tr>
<tr>
<td>Stagger entry</td>
<td>Physical separation through zones</td>
</tr>
<tr>
<td>Entry controls</td>
<td>Critical function teams</td>
</tr>
<tr>
<td>Limit on-site capacity</td>
<td>Implement one-way store aisles</td>
</tr>
<tr>
<td>Restrict non-employee entry</td>
<td>Separation between customers</td>
</tr>
<tr>
<td>Separate hours for vulnerable populations</td>
<td>Minimize person-to-person contact</td>
</tr>
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### Pre-entry
<table>
<thead>
<tr>
<th>Travel to work</th>
<th>At work</th>
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<tbody>
<tr>
<td>Two-way communication channels</td>
<td>Use prominent displays highlighting new processes and policies</td>
</tr>
<tr>
<td>Completed return to work trainings</td>
<td>Promote healthy personal habits</td>
</tr>
<tr>
<td>Safe commute and wellness practices</td>
<td>Provide cleaning equipment</td>
</tr>
<tr>
<td>Clearly communicate safety protocols at entry</td>
<td>Frequent cleaning</td>
</tr>
<tr>
<td>Increase awareness</td>
<td>High-visibility cleaning</td>
</tr>
<tr>
<td>12</td>
<td>33</td>
</tr>
<tr>
<td>What to expect when returning</td>
<td>Reduce operating hours to clean</td>
</tr>
<tr>
<td>Two-way communication channels</td>
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<td>48</td>
</tr>
<tr>
<td>At-home surveys</td>
<td>Improve air filtration / ventilation</td>
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<td>Entry controls</td>
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<td>Limit on-site capacity</td>
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<td>14</td>
<td>58</td>
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<td>Restrict non-employee entry</td>
<td>Replace communal food options</td>
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### Use protective equipment
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<td>Increase awareness</td>
<td>Increase hygiene protocols</td>
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### Content being developed
- Close common areas
- Limit capacity in elevators
- Stagger lunch hours
- Cafeteria physical distancing
- Dormitory safety practices
- walkthrough assessment
- Limit larger gatherings of employees
- Monitor policy adherence
- Establish team or communication chain

### Common spaces
- Close common areas
- Limit capacity in elevators
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### Post-infection
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**McKinsey & Company**
Sample journey: Manufacturing environment

**Travel to work and pre-entry**
- Use of masks required during employee commutes
- Temperature checks

**At Work**
- Modularized spaces, with limited interaction across spaces
- High-frequency cleaning of high-touch surfaces and spaces
- Improved air filtration/ventilation
- Clear posters on safety guidance and sickness protocols
- Masks and other appropriate PPE required at all times

**Common space use**
- Separated lunch seating with dividers on dining tables
- Use of non-reusable dishes at cafeterias

Source: Expert interviews, press search, client surveys

*Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client*
Sample journey: Office environment

Travel to work and pre-entry

- Masks required and provided for employees
- Limited entrance for non-employees

At Work

- Reorganized seating (6 feet apart)
- Headcount limited below fire code limit (e.g., limiting number of entries by shifts)
- Masks required at all times (Except when working individually more than 6 feet apart)
- Increased frequency of cleaning of high-touch surfaces

Common space use

- Separated lunch seating
- Increased frequency cleaning with visibly monitored cleaning schedules

Source: Expert interviews, press search, client surveys

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Sample journey: Retail environment

Travel to work and pre-entry

**EARLY SHIFT**
- Staggered entry and work shifts

**LATE SHIFT**
- Upgraded PPE encouraged, required and/or provided

At Work

- Guidance on no-questions-asked sick leave
- Plexiglass shields installed at cash registers

Common space use

- Increased cleaning of high-touch surfaces and spaces (e.g., Bathrooms)

Source: Expert interviews, press search, client surveys

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Pre-entry
Periodic health risk categorization through at-home surveys

**Description of potential intervention**

Send out online **health self-assessment program** to fill it out to all employees every Sunday regarding COVID-related symptoms

- Those who do not reply would be separately examined at the entrance of company facilities the next day
- Survey helps determine health risk of employees and advises readiness to return to work

Opt-in program for subsidized **connected thermometers** system for early warning

**Where this has been done**

South Korean conglomerates

Corporate offices in China

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Share with and train employees on what to expect when returning to the workplace

Description of potential intervention

Use online and remote channels to share with employees what to expect when returning to the workplace. Include information on:

- **Sick leave, compensation and related updated policy guidance**
- **Database on resources and support available** to employees (mental health, childcare, policy guidelines, privacy safeguards)
- **Information on new work practices, infrastructure** and changes to daily schedule and operations
- **Personal wellness** guidance for outside of the work place

Where this has been done

Corporate offices in the U.S. when initially moving to remote working

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Source: Expert interviews, press search, client surveys
Establish two-way communication channels as employees prepare for return

Online townhalls, information campaigns and trainings

Description of potential intervention

- Develop online modules and trainings to ensure employees have adequately understood all new guidelines and resources
- Conduct virtual townhalls with leadership to address questions on a company-wide forum and ensure clarity of message to workforce
- Proactively survey employees to gather feedback on measures adopted and to inform new workplace safety measures
- Share pre-packaged print material (consistent with displays and posters used in the workplace)

Where this has been done

Corporations in the U.S.

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Ensure employees have completed all return to work trainings prior to entry

App-based test training

Description of potential intervention

Allow entrance to worksite only after passing an app-based test training provided to workers on prevention measures

Where this has been done

Corporate offices in China

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Source: Expert interviews, press search, client surveys
Educate employees on safe commute, work and personal wellness practices

Wearing a mask during commute

Online trainings on commuter safety

Description of potential intervention

Train employees on commuter safety practices such as wearing masks in public, avoiding rush hour, choosing to walk for part of the trip, etc.

Require use of PPE on commute in to work

Provide employees with sanitation packs to be used for public transport such as mini sanitizers, quick access wipes and gloves

Train employees on best practices for cleaning and disinfecting following use of public transport and prior to entry

Where this has been done

Multiple organizations worldwide

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Increase safety protocol in company sponsored travel

Description of potential intervention

**Restrict seating** on company operated shuttles to half capacity

**Temperature check** employees prior to boarding the shuttle

**Disinfect shuttle vehicle** after each trip. Provide disinfecting kits and PPE to shuttle operators/drivers

Where this has been done

Factories in China

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Encourage employees to use private transport where possible

Description of potential intervention

Encourage walking or private transport when feasible for commute (over public transportation)

Subsidize parking at workplace – increase capacity if necessary

Provide gas subsidies for employees driving to work

Where this has been done

Corporate offices in Asia

Source: Expert interviews, press search, client surveys

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client
Stagger entry for employees and customers

Description of potential intervention

Institute a 'Flexible Commuting' policy for all employees to avoid rush hours and stagger entry windows

Adopt virtual waiting areas or online appointment scheduling to reduce congestion at entry

Where this has been done

Grocery stores in the US

Restaurants and museums in China, S. Korea

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Increase controls at entry point (1/2)

Separate entry and exit

Maintain physical distancing in entry queue

Description of potential intervention

Maintain 6 ft distance between individuals lining up for entry

Camera controlled entry to the building after entry criteria is met to prevent congestions

Separate points of entry and exit to minimize and streamline contact between employees

Where this has been done

Factories across China
South Korean conglomerate
Grocery stores across the U.S.

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Increase controls at entry point (2/2)

Distinct entry for critical teams

Description of potential intervention

Dedicate building entrances for specific teams / functions to minimize overlap and exposure:

- For all critical personnel
- For personnel working in the control room
- For specific groups of teams

Where this has been done

Utilities companies in the U.S.

Market operators in the U.S.

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Temperature testing stations at entry

Temperature cameras to measure temperature at entrance

Description of potential intervention

**Conduct temperature checks** of employees

**Heat-sensing camera** implemented at entrance that tracks temperature of employees

**QR code scanner** at entry to confirm employees have passed health criteria (e.g., COVID-symptoms, not on quarantine list)

Where this has been done

Manufacturing plants for S. Korean conglomerates

Corporate offices/Restaurant operators in China

Multinational clothing retail stores in China

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Clearly communicate safety protocols at entry

Increase awareness

Office | Field

Description of potential intervention

Hang posters at entry points as part of broader information and learning campaign

Place QR code on the door that launches an illustrated guide to the shop’s safety procedures

Where this has been done

- Multinational clothing retail stores in China
- Large chain tea café in China

Posters of safety protocol, with QR scanner for detailed procedures

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Limit on-site capacity

Description of potential intervention

Update, reduce capacities for work spaces – for employees as well as customers

Prohibit entry for non-employees or visitors else require visitor sign ins

Restrict entry for specific zones such as production floors

Implement 1 in 1 out measures where feasible

Where this has been done

Grocery stores in the US

Corporate offices in China and S. Korea

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Restrict non-employee entry

Description of potential intervention

**Prohibit entry for visitors**, non-badged contractors and non-employees except for critical activities

**Screen non-badged contractors/vendors** with health questionnaire and temperature check before allowing on site for deliveries, repairs, etc.,

**Require pre-approval** for all non-employee entrants to the office

Where this has been done

Aerospace manufacturer in China

Utilities companies, power plants and market operators in the U.S.
Provide disinfectants as well as disinfected bags, carts and trolleys at entry

Where this has been done
Grocery stores in the US

Description of potential intervention
Institute regular cleaning of items shared by customers (e.g., shopping carts, bags, trolleys)
Provide hand sanitizer and disinfecting wipes (for cellphone screens) before entry
Require employees or customers to leave any non-essential items in a designated storage area prior to entry

Cleaning shopping carts
Providing hand sanitizer and disinfecting wipes

Source: Expert interviews, press search, client surveys

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client
Separate hours for vulnerable populations

Description of potential intervention

Implement dedicated shopping hours for vulnerable groups (elderly, persons with disabilities and pregnant women) to reduce risk of infection for at-risk persons.

Extend opening times allow flexibility for vulnerable populations and to reduce density of customers in the store at a given time.

Balance extra hours with time allotted for extra cleaning as well.

Where this has been done

Large grocery stores in the U.S., U.K.

Source: Expert interviews, press search, client surveys

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client.
Encourage or mandate appropriate PPE¹ gear (1/2)

PPE required or provided at entry

Safe working kits

1 Critical PPE (surgical masks, N-95, etc.) must continue to be reserved for healthcare workers and other medical first responders. Use should be in accordance with local government and health organization guidelines

Description of potential intervention

Forbid anyone who doesn’t wear face masks from entering into company buildings

Alternatively, recommend face masks and gloves in all or specifically-designated areas of the company

Compensate employees for buying facemasks

Provide face masks (and safe working kits) to employees for free and distribute upon entry

Where this has been done

South Korean conglomerates

S. Korean multinational automotive manufacturer began preparation of mask production for its own employees

China: Multinational clothing retail brands

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¹ Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Encourage or mandate appropriate PPE gear (2/2)

Details in Appendix

## Description of potential intervention

Encourage or mandate PPE usage based on work environment:

- **Healthcare workers** given preference for N95 respirators (use for 5-7 days) or provided 2 masks a day
- **Production employees** wear polyester gloves and glasses
- **Office employees and customer-facing employees** given daily masks (cloth masks suffice)

### Where this has been done

- Aerospace and Defense manufacturer in China
- Companies in South Korea
- Clothing retail stores in China
- Grocery stores in the U.S.

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### PPE Usage

<table>
<thead>
<tr>
<th>OSHA Risk Level</th>
<th>Respirators and masks</th>
<th>Gowns</th>
<th>Eye protection</th>
<th>Gloves</th>
</tr>
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<tr>
<td>High-Very High Risk</td>
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<td><img src="image2.png" alt="Image" /></td>
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Source: Expert interviews, press search, client surveys.
Provide mental health services to employees affected by COVID-19 / quarantine

Description of potential intervention

Provide counselling (teletherapy) services to employees returning to work after prolonged quarantines

Expand benefit coverage of EAP programs

Hire an on-site specialist for therapy in the office place

Provide employees with free subscriptions to apps that aid with better mental health practices (eg. Guided meditations)

Where this has been done

Corporations in the U.S.

Multinational coffee house

American financial services company

Teletherapy services as well as online support on navigating mental health resources

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
At work
Stagger work shifts between employees

Description of potential intervention

Stagger shifts / implement flexible work hours to prevent overlap between employees and improve contact tracing

Eliminate interactions across shifts:

- Use video conferencing for handoffs / transfers from one work shift to the next
- Use virtual onboarding and briefings (e.g., online conferencing services, conference calls)
- Conduct briefings in the field to reduce large meetings

Where this has been done

Aerospace and defense manufacturer in China

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Reduce operating hours to accommodate additional cleaning

Reduced operating hours so more deep cleaning can be done

Description of potential intervention

Reduce operating hours for deep-cleaning of the space and sanitization of products

Where this has been done

US grocery stores

Grocery stores around the world

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Promote healthy personal habits with high-visibility signage and media campaigns

Promote healthy habits with high-visibility signage across the workspace (e.g., wash hands frequently)

Leverage media and advertising to create awareness among employees and customers

Where this has been done

Corporate offices in China
Corporate offices in US (prior to full closure)
Several multinational retail brands have used advertising to promote social distancing

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Highlight new workplace safety processes and policies through prominent displays

Informational materials in displays and advertising

Display large format posters or digital displays providing prominent, frequent reminders to employees of the new workplace situation, protocols and (crucially) the rationale behind it.

Where this has been done

Corporate offices in China

Increase awareness

Office

Description of potential intervention

Display large format posters or digital displays providing prominent, frequent reminders to employees of the new workplace situation, protocols and (crucially) the rationale behind it.

Where this has been done

Corporate offices in China

Informational materials in displays and advertising

[Image of promotional material]
Encourage or mandate appropriate PPE\(^1\) gear (1/2)

**PPE required or provided at entry**

1 Critical PPE (surgical masks, N-95, etc.) must continue to be reserved for healthcare workers and other medical first responders. Use should be in accordance with local government and health organization guidelines.

**Safe working kits**

Use protective equipment

Office  |  Field

**Description of potential intervention**

- **Forbid anyone who doesn’t wear face masks** from entering into company buildings
- Alternatively, **recommend face masks and gloves** in all or specifically-designated areas of the company
- **Compensate employees for buying facemasks**
- **Provide face masks (and safe working kits) to employees** for free and distribute upon entry

**Where this has been done**

South Korean conglomerates
- S. Korean multinational automotive manufacturer began preparation of mask production for its own employees
- China: Multinational clothing retail brands

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Source: Expert interviews, press search, client surveys
Encourage or mandate appropriate PPE\(^1\) gear (2/2)

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Use protective equipment

Office | Field

Description of potential intervention

Encourage or mandate PPE usage based on work environment:

- Healthcare workers given preference for N95 respirators (use for 5-7 days) or provided 2 masks a day
- Production employees wear polyester gloves and glasses
- Office employees and customer-facing employees given daily masks (cloth masks suffice)

Where this has been done

Aerospace and Defense manufacturer in China
Companies in South Korea
Clothing retail stores in China
Grocery stores in the U.S.

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Source: Expert interviews, press search, client surveys
Limit sharing and disinfect PPE at regular intervals

Description of potential intervention

Ensure protective clothing and PPE (including masks/face coverings) are not shared between employees or contractors or limit sharing to the extent possible

Disinfect employee uniforms at the end of the day

Provide mask disinfection cabinets at regular distances

Where this has been done

Multinational automotive manufacturer in China
Utilities companies in the U.S.
Power plants in the U.S.

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Ensure physical separation within the office space

Separate seating arrangements

6 Feet distance

Description of potential intervention

Redo seating arrangement to reduce contact and transmission risk between employees

Allocate permanent seats and temporarily restrict free seating assignment systems

Where this has been done

Corporate offices for conglomerates in S. Korea

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Ensure physical separation through the use of zones

Clear separation of zones

Description of potential intervention

Separate different zones in manufacturing plants, with limited movement for employees between zones

Spread employee at least (3 feet) to an extent possible on the manufacturing floor

Break up call center into zones with separate break areas, entrances and restrooms. Tape off with signage and prohibit crossing of zones without disinfection

Restrict movement through various parts of the office for staff working in that particular section

Where this has been done

Factories in China

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Source: Expert interviews, press search, client surveys
Establish “remote-first” practices to improve culture for remote colleagues

Description of potential intervention

Establish the Big 5 of “remote-first” culture:

• Video conferencing by default
• Accessible, structured, and documented team meetings
• Document everything – decisions, work in progress, etc.
• No sidebar conversations (unless you document them)
• Planned together-time (e.g., offsites)

Consistently use digital tools (e.g., code management, documentation management, defect tracking, integration)

Where this has been done
Large American financial services corporation

Adopt “remote-first” culture of video conferencing even when in the office

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client
Source: Expert interviews, press search, client surveys
Group employees into critical function teams, operating pods or work shifts (1/2)

**Description of potential intervention**

Group employees into “operating pods” that stick together (work, travel, live, and eat, as applicable) to facilitate health tracking and reduce risk of infection between different pods.

Divided critical function teams with groups alternating work in-office or using satellite sites.

Restrict retail work shifts to the same group of employees with minimal overlap time between groups.

Alter assignments for work tasks that must occur in close proximity (less than 6 feet) by pairing technicians into a “team” and do not rotate individuals with other teams.

**Where this has been done**

Multinational electronics manufacturer in China

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Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client.

Source: Expert interviews, press search, client surveys.
Group employees into critical function teams, operating pods or work shifts (2/2)

Where this has been done

Factories in China have used partitions to split projects into smaller groups

Description of potential intervention

Shift to **multiple, smaller staging sites** instead of concentrated, larger staging sites to limit contact-with / exposure-to larger crews

Design smaller staging sites to **allow CDC distancing** recommendations to be followed (currently 6 feet of distancing at all times)

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Provide cleaning equipment to employees and customers

Description of potential intervention

Provide cleaning supplies, hand sanitizer, and sanitation supplies, for all crews located at staging areas

Installation of hand sanitizer dispensers throughout building

Disinfecting wipes available in neighborhoods and meeting rooms

UV light cell phone disinfectants available in both lobbies

Where this has been done

Corporate offices and manufacturing plants worldwide

Source: Expert interviews, press search, client surveys

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client
Implement one-way store aisles with fewer sales specialists

Where this has been done
Grocery stores in China/U.S.

Description of potential intervention
Implement one-way aisles in stores to reduce density of traffic and unnecessary interactions.

Reduce the number of sales specialists on the floor to decrease congestion and transmission risk.

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client.

Source: Expert interviews, press search, client surveys.
Reduce in-store services with high contact

Eliminate in-store food samples in grocery stores / restaurants

Discourage touching of merchandise / trying on of clothes (e.g., signs to not touch glass, close changing rooms)

Disinfect test products after each demo

Encourage customers not to return items to shelves

Where this has been done

Large US supermarkets

Multinational clothing-retailers

Description of potential intervention

Drive safe behavior norms

Office | Field

Pre-entry | Travel to work | At Work | Common areas | Post-infection

Source: Expert interviews, press search, client surveys

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client
Ensure physical separation between customers

Queue for fitting room

Spacing between employees and customers

Separate in space & time

Office | Field

Description of potential intervention

Require distance of at least 6 feet between shoppers

Space out customer queues for fitting rooms and at cashiers with floor markers

Adopt virtual waiting area / queue and use online appointment scheduling where feasible

Where this has been done

Grocery stores in the U.S.

Multinational retail stores in China

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Have contactless thermometers visibly available onsite

Description of potential intervention

Include contactless thermometers in all offices and worksites (e.g., in first aid kits) to encourage safe, opt-in temperature testing through the day.

Where this has been done

Global corporate offices of large fast food chain

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client.

Source: Expert interviews, press search, client surveys.
Minimize person-to-person contact for material distribution

Description of potential intervention

Minimize person-to-person contact for material distribution by using drop points

Increase use of conveyer belts for material distribution such as for material deliveries on factory floors

Use small slides and conveyer belts for food transfer between employees and customers

Where this has been done

Restaurants in China

Utilities companies in the U.S.

Manufacturing factories in China

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Institute a clean desk/ work station policy for all employees

Description of potential intervention

Institute a clean desk policy to support overall office health and safety with daily cleaning and disinfection after the work day.

Where this has been done

Global corporate offices of large fast food chain.
Limit larger gatherings/meetings of employees

Encourage video/audio calls

Limit in-person gatherings to no more than 2 people to a room

Cancel non-business-critical, in-person activities (e.g., happy hours, community service)

Hold necessary group meetings (e.g., Town Hall, Steering Committee, Board meetings) via Video Conference wherever possible (even if employees are in the office)

Where this has been done
American multinational companies
Corporate offices in South Korea

Description of potential intervention

Drive safe behavior norms
Office | Field

Source: Expert interviews, press search, client surveys

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client
Move in-person processes to digital

Description of potential intervention

Move paper-based / in-person processes to digital forms (e.g., various construction forms, check-lists, maps, timesheets)

Where this has been done

Retail multinationals digitizing sales process
Corporate offices digitizing badging-in / sign-in process
Hotel chains and retailers in North America
Utilities companies in the U.S.

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client
Source: Expert interviews, press search, client surveys
Encourage frequent and staggered sanitization breaks for all employees

Description of potential intervention

Have opt-in, staggered hand washing breaks to allow for frequent cleaning without causing congestions

Encourage use of alcohol-based hand sanitizer at certain time intervals

Where this has been done

Corporate offices and manufacturing plants in China

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Monitor best-practice adherence to inform helpful interventions

Description of potential intervention

Install badge scanners at the entrance to each room and require employee use to generate live data of employee traffic for:

- Identifying outlier employees with high transmission potential (e.g., move through 10x more rooms and floors than avg)
- Intervening effectively with empirical data on movement patterns
- Better understanding high-traffic areas to reorganize office norms and equipment accordingly

Have digital sign-in desks between rooms (both monitoring and discouraging excessive movement)

Where this has been done

Corporate offices in the U.S.
Emphasize high-frequency, high-visibility cleaning (1/2)

Visible cleaning schedules displayed

High-frequency cleaning – increased to every 2 hours from every 6 hours

Description of potential intervention

Frequent cleaning of high-traffic areas / surfaces (e.g., lobbies, communal tables, cafeterias, bathrooms, elevators, stairways)

Clearly demarcate surfaces that are frequently contacted by employees to raise awareness.

Increase frequency of cleaning of demarcated surfaces throughout the workday

Increased routine sanitization of common areas to every 2 hours from every 6 hours

Where this has been done

Automotive manufacturer in S. Korea
US grocery stores
Corporate offices in the U.S.

Source: Expert interviews, press search, client surveys

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client
Emphasize high-frequency, high-visibility cleaning (2/2)

Increased frequency cleaning with visibly monitored cleaning schedules

**Description of potential intervention**

Visible recording and monitoring of cleaning

Cleaners can update a ‘confirmation of cleaning’ list or display in a highly prominent location upon completion of cleaning.

**Where this has been done**

Corporate offices in China

US grocery stores

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Ensure appropriate deep-cleaning of surfaces and spaces

Description of potential intervention

Use ultraviolet germicidal irradiation to clean critical function rooms (e.g. operations centers, real-time market trading desks, IT operations centers, call centers, kitchens, etc.)

Increase use of iodine/ethanol for sanitization (e.g. mat infused with product to clean shoes)

All common tools, dinnerware and kitchen equipment disinfected daily after closing with bleach or ethanol

All goods/packages shipped between facilities or between central kitchen and restaurants sanitized on both ends

Where this has been done

Large restaurant chain in China
MNC corporate offices

Source: Expert interviews, press search, client surveys

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client
Improve air filtration / ventilation to remove aerial antigens

Improved air filtration and ventilation systems

HEPA (high-efficiency particulate air)-rated filter

Ensure airflow does not aid transmission through droplets

Description of potential intervention

Install high-efficiency air filters and increase ventilation rates in the work environment

Avoid using central air conditioning and heating systems where possible

Where this has been done

Multinational automotive manufacturer in S. Korea heightened ventilation requirements beyond government guidelines

Source: Expert interviews, press search, client surveys
Install plexiglass barriers between employees and customers

Description of potential intervention

Install physical glass barriers to minimize the spread of disease between employees and customers entering the store.

Where this has been done

Implemented at several grocery stores and select retail stores in North America and China.
Restructure physical stores to operate as “dark stores”

Description of potential intervention

Restructure physical stores to become “dark stores” (similar to dark kitchen): Locations that look like stores but are closed to customers (for online order & delivery only)

Set up street-front counters so that customers can buy vegetables, alcohol, cigarettes and other goods without entering

Where this has been done

Restaurants in China/U.S.
Small retail stores in China

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Migrate entirely to contactless payment

Description of potential intervention

**Enforce contactless transactions**
(e.g., no cash, Apple Pay, WeChat Pay, contactless card taps)

Where this has been done
Large US supermarkets

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Implement curbside pick ups

Description of potential intervention

Implement curbside pickups for online or mobile app orders

Use apps to coordinate customer entry into pick up aisles

Encourage customers to use curbside pickup over in-store options

Where this has been done

Grocery and household essentials stores in the U.S.

Electronics, books and shoe stores in the U.S.
Alter return and cancellation policies

Full refunds for airline ticket purchases

Temporarily suspend return of all physical items

Extend return policy for 30 days (or similar period) till after COVID-19 related restrictions are lifted

For pre-booked tickets, offer no-fee changes and cancellations (Airlines)

Where this has been done

Multinational retail stores in the U.S. and Canada

Global airline in Asia and Europe

Description of potential intervention

Drive safe behavior norms

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Create a culture of community responsibility and collective health

Description of potential intervention

Emphasize each individual’s role in the health of the entire community (e.g., one sickness can infect your colleagues, their families, the colleagues of their families)

Increase individual responsibility and accountability to self-report and stay home if they fear infection

Normalize (and even celebrate) socially responsible behavior (e.g., advising colleagues on safe practices, addressing hygiene violations)

Where this has been done

Pharmaceutical companies in the U.S.

Normalize individual responsibility to maintain best practices

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Issue clear guidance on sick leave, compensation and related policies

Drive safe behavior norms

Office | Field

Description of potential intervention

Institute a flexible sick leave policy (e.g., no-questions-asked) to help drive an office culture of responsibly staying home with any symptoms.

Proactively develop and communicate compensation, attendance and reliability, PTO, and related polices that will apply during the ongoing conditions.

Reimburse sick time off and institute short-term disability leave programs and emergency leave policy.

Where this has been done

US grocery stores

No-questions-asked sick leave

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client.

Source: Expert interviews, press search, client surveys.
Implement strict domestic, national and international travel policies

Description of potential intervention

Require employees to report all national and international travel and issue guidance on self-quarantines

Prohibit non-essential travel (domestic, international, or even within the city)

Advise employees who exit the building for external business meetings during the day to go straight to home rather than return to office

Where this has been done

Multinational corporations in the U.S., U.K.
Conglomerates in South Korea

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Common space
Identify high risk areas based on a walkthrough assessment

Description of potential intervention

Have an employee, employee team or third-party perform a walkthrough assessment to identify high-risk, high-touch areas

Use this assessment to inform new safety measures

Where this has been done

Multinational aerospace manufacturer
Remove or replace high-touch communal resources

Description of potential intervention

Remove or provide alternatives for high-touch communal resources with individualized services. For example:

- Replace coffee machines with individual coffee deliveries
- Use bottles water or motion sensing water dispensers in place of water fountains
- Remove vending machines

Where this has been done

Multinational aerospace manufacturer
Corporate offices in the US

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client
Source: Expert interviews, press search, client surveys
Close common areas and provide strict protocols for when they reopen

**Description of potential intervention**

Common areas to be cordoned off initially

Specify employee usage protocols for all must-use common areas including pre-booking spaces for use, cleaning before and after use, limiting the capacity, etc

**Where this has been done**

Corporate offices in China

Conglomerates in S. Korea

Multinational automotive manufacturer in S. Korea

Multinational aerospace manufacturer

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Minimize use of handles and physical interfaces

Modified surface to minimize contact

Description of potential intervention

Greater use of motion-control doors and interfaces throughout the workspace.

- Reduces the risk of workers contacting a contaminated surface.
- Could help to reduce the cleaning requirement

If motion control is not available, option to modify item to minimize contact such as foot operated door handles

Remove need for physical interface where possible such as leaving doors open

Where this has been done

Corporate offices in China

Global corporate offices of fast food chain is installing hand free door openers and towel dispensers

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Limit larger gatherings/meetings of employees

Encourage video/audio calls

Repurpose conference rooms

Description of potential intervention

Limit in-person gatherings to no more than 2 people in a room.

Cancel non-business-critical, in-person activities (e.g., happy hours, community service).

Hold necessary group meetings (e.g., Town Hall, Steering Committee, Board meetings) via Video Conference whenever possible (even if employees are in the office).

Where this has been done

American multinational companies

Corporate offices in South Korea

Source: Expert interviews, press search, client surveys

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client.
Limit capacity in elevators

Limit capacity of elevators to enforce physical distancing (e.g., 2 people in small elevators, 4 in large)

Where this has been done
International quick-service restaurant chain in China
Residential complexes in the U.S.
Corporate offices in China

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client
Source: Expert interviews, press search, client surveys
Improve air filtration / ventilation to remove aerial antigens

Description of potential intervention

Install high-efficiency air filters and increase ventilation rates in the work environment

Avoid using central air conditioning and heating systems where possible

Where this has been done

Multinational automotive manufacturer in S. Korea heightened ventilation requirements beyond government guidelines

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Monitor best-practice adherence to inform helpful interventions

Description of potential intervention

Install badge scanners at the entrance to each room and require employee use to generate live data of employee traffic for:

- Identifying **outlier employees** with high transmission potential (e.g., move through 10x more rooms and floors than avg)
- **Intervening effectively** with empirical data on movement patterns
- Better understanding **high-traffic areas** to reorganize office norms and equipment accordingly

Have **digital sign-in desks** between rooms (both monitoring and discouraging excessive movement)

Where this has been done

Corporate offices in the U.S.

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Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Emphasize high-frequency, high-visibility cleaning (1/2)

Visible cleaning schedules displayed

High-frequency cleaning – increased to every 2 hours from every 6 hours

**Description of potential intervention**

**Frequent cleaning of high-traffic areas / surfaces** (e.g., lobbies, communal tables, cafeterias, bathrooms, elevators, stairways)

**Clearly demarcate surfaces that are frequently contacted** by employees to raise awareness.

**Increase frequency of cleaning of demarcated surfaces throughout the workday**

**Increased routine sanitization** of common areas to every 2 hours from every 6 hours

**Where this has been done**

Automotive manufacturer in S. Korea

US grocery stores

Corporate offices in the U.S.

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Emphasize high-frequency, high-visibility cleaning (2/2)

Increased frequency cleaning with visibly monitored cleaning schedules

Description of potential intervention

Visible recording and monitoring of cleaning

Cleaners can update a ‘confirmation of cleaning’ list or display in a highly prominent location upon completion of cleaning.

Where this has been done

Corporate offices in China
US grocery stores
Ensure appropriate deep-cleaning of surfaces and spaces

**Description of potential intervention**

Use **ultraviolet germicidal irradiation** to clean critical function rooms (e.g. operations centers, real-time market trading desks, IT operations centers, call centers, kitchens, etc.)

Increase use of **iodine/ethanol for sanitization** (e.g. mat infused with product to clean shoes)

All common tools, dinnerware and kitchen equipment disinfected daily after closing with **bleach or ethanol**

All goods/packages shipped between facilities or between central kitchen and restaurants **sanitized on both ends**

**Where this has been done**

- Large restaurant chain in China
- MNC corporate offices

*Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client*

*Source: Expert interviews, press search, client surveys*
Encourage or mandate appropriate PPE\(^1\) gear (1/2)

PPE required or provided at entry

Safe working kits

1 Critical PPE (surgical masks, N-95, etc.) must continue to be reserved for healthcare workers and other medical first responders. Use should be in accordance with local government and health organization guidelines

Description of potential intervention

Forbid anyone who doesn’t wear face masks from entering into company buildings

Alternatively, recommend face masks and gloves in all or specifically-designated areas of the company

Compensate employees for buying facemasks

Provide face masks (and safe working kits) to employees for free and distribute upon entry

Where this has been done

South Korean conglomerates

S. Korean multinational automotive manufacturer began preparation of mask production for its own employees

China: Multinational clothing retail brands

Source: Expert interviews, press search, client surveys

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client
Encourage or mandate appropriate PPE\(^1\) gear (2/2)

Details in Appendix

<table>
<thead>
<tr>
<th>OSHA Risk Level</th>
<th>Respirators and masks</th>
<th>Gowns</th>
<th>Eye protection</th>
<th>Gloves</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-Very High Risk</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>Medium Risk</td>
<td><img src="image5.png" alt="Image" /></td>
<td><img src="image6.png" alt="Image" /></td>
<td><img src="image7.png" alt="Image" /></td>
<td><img src="image8.png" alt="Image" /></td>
</tr>
<tr>
<td>Low Risk</td>
<td><img src="image9.png" alt="Image" /></td>
<td><img src="image10.png" alt="Image" /></td>
<td><img src="image11.png" alt="Image" /></td>
<td><img src="image12.png" alt="Image" /></td>
</tr>
</tbody>
</table>

1 Critical PPE (surgical masks, N-95, etc.) must continue to be reserved for healthcare workers and other medical first responders. Use should be in accordance with local government and health organization guidelines.

Description of potential intervention

Encourage or mandate PPE usage based on work environment:

- Healthcare workers given preference for N95 respirators (use for 5-7 days) or provided 2 masks a day
- Production employees wear polyester gloves and glasses
- Office employees and customer-facing employees given daily masks (cloth masks suffice)

Where this has been done

- Aerospace and Defense manufacturer in China
- Companies in South Korea
- Clothing retail stores in China
- Grocery stores in the U.S.

Use protective equipment

Office | Field

Source: Expert interviews, press search, client surveys

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client.
Promote healthy personal habits with high-visibility signage and media campaigns

Where this has been done
- Corporate offices in China
- Corporate offices in US (prior to full closure)

Several multinational retail brands have used advertising to promote social distancing

Description of potential intervention
Promote healthy habits with high-visibility signage across the workspace (e.g., wash hands frequently)

Leverage media and advertising to create awareness among employees and customers

Where this has been done
- Corporate offices in China
- Corporate offices in US (prior to full closure)

Several multinational retail brands have used advertising to promote social distancing
Highlight new workplace safety processes and policies through prominent displays

Informational materials in displays and advertising

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client
Source: Expert interviews, press search, client surveys

Description of potential intervention

Display large format posters or digital displays providing prominent, frequent reminders to employees of the new workplace situation, protocols and (crucially) the rationale behind it

Where this has been done

Corporate offices in China
Stagger lunch hours and time spent in common areas

Staggered lunch schedule

Description of potential intervention

**Stagger lunch hours** in order to distribute the amount of people coming to cafeteria at a time

**Extend operating hours for cafeterias** in order to reduce density of people present in the space at any time

**Similarly, stagger other routine activities in common areas**

Where this has been done

- Corporate offices in China
- Offices and manufacturing plants in S. Korea

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Encourage physical distancing in cafeterias

Description of potential intervention

Prevent physical proximity in cafeteria

- **Set up partitions** on dining tables
- **Prohibit employees from sitting next to and facing each other** at cafeterias (checker board arrangement)
- **Recommend to minimize chatting while eating**

Where this has been done

- Corporate offices in China
- Offices and manufacturing plants in S. Korea

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Reduce or replace communal and self-serve options in food service

Pre-portioned lunchboxes

Full-service food trucks in the summer

Description of potential intervention

Swap self-service lunch options like buffets for pre-packaged and portioned meals – minimizing shared utensils and exposure risk to the meal.

In the summer, this can be done through **food trucks in an open space**

Remove condiments or items at tables that persist between customers

Remove **self-service food extras** such as drink dispensers, napkins, utensil trays, etc

Where this has been done

Corporate offices in China

Multinational automotive manufacturer in S. Korea increased lunch box delivery volume in cafeterias

Health protection agency in Scotland has warned hospitality industries against communal meal sharing and buffets

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Increase hygiene protocols for shipping/receiving areas

Description of potential intervention

Limit access of commercial drivers' to shipping area and separate them from staff

Increase hygiene protocols for shipping/receiving areas (e.g., sanitize all incoming packages)

Enforce masks, gloves, and other PPE when dealing with external packages

Where this has been done

Factories in China

Advanced electronics manufacturer in the US
Support employee safety practices in dormitories and accommodations as applicable

Description of potential intervention

Provide dormitories on work campus to reduce risk of employees contracting disease elsewhere or spreading to their families

Institute policy for all employees who leave campus to sleep must re-do quarantine when they return

Redesigned dormitories and common areas to enable distancing

Disallow employees to share corporate apartments and provide isolated accommodations instead

Where this has been done

Large electronics manufacturer in China
Automotive manufacturer in China

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Establish team or communication chain to collect questions and concerns from community

Collect suggestions/concerns from employees and prominently display FAQ

Set up a hotline for employees to report hygiene violations/concerns

Description of potential intervention

Collect feedback (queries and concerns) from frontline team members:

• Have supervisors collect queries and concerns from frontline team members every morning
• Setup a hotline to include suggestions/areas of improvement

Publish an updated Q&A list (as frequently as possible):

• Display on monitors / posters around the factory daily
• Upload to a corporate website

Where this has been done

Automotive manufacturer in China

Does not reflect McKinsey guidance customized to individual client needs - should be vetted against applicable legal and business requirements before application to a specific client

Source: Expert interviews, press search, client surveys
Appendix
Range of respirator and mask options provide different levels of performance

Generalization; selection should be made based on hazard assessment

<table>
<thead>
<tr>
<th>Critical supply</th>
<th>Reduces wearer’s exposure to airborne particles</th>
<th>Protects others from wearer’s respiratory emissions</th>
<th>Fluid resistant</th>
<th>Re-use</th>
<th>Relative unit cost</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAPR</td>
<td>Can filter &gt;95% of particles &gt;0.3 microns</td>
<td>Yes</td>
<td>Yes</td>
<td>Durable product</td>
<td>Highest</td>
<td>Provide high level protection with better comfort for high temperature jobs; more compatible with facial hair</td>
</tr>
<tr>
<td>Full facepiece</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>Durable product</td>
<td>Higher</td>
<td>Better performance than disposable respirators for sweaty or dusty jobs</td>
</tr>
<tr>
<td>Half facepiece</td>
<td>• Good face seal</td>
<td>Yes</td>
<td>Yes</td>
<td>Durable product</td>
<td>Middle</td>
<td>Better performance than disposable respirators for sweaty or dusty jobs</td>
</tr>
<tr>
<td>Surgical N95 respirator</td>
<td>Can filter &gt;95% of particles &gt;0.3 microns</td>
<td>Yes</td>
<td>Yes</td>
<td>Unknown</td>
<td>Lower</td>
<td>Generally used for health care providers</td>
</tr>
<tr>
<td>N95 respirator</td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Multi-use if cleaning is allowed</td>
<td>Lower</td>
<td>Generally used for health care providers and other high risk activities</td>
</tr>
<tr>
<td>Surgical mask</td>
<td>• Some filtering performance • Loose face seal</td>
<td>Yes</td>
<td>Yes</td>
<td>Single use / replace daily in offices</td>
<td>Lower</td>
<td>Generally used for medium risk activities While a loose face seal blocks fewer particles it improves breathability</td>
</tr>
<tr>
<td>Non-spec products (commercial and homemade)</td>
<td>Varies</td>
<td>Yes</td>
<td>Varies</td>
<td>Varies</td>
<td>Lower to middle</td>
<td>Wide range of alternatives with varied levels of performance and cost; typically for personal use</td>
</tr>
</tbody>
</table>

A: Durable respirators may provide greater protection and worker comfort relative to N95 respirators

<table>
<thead>
<tr>
<th>Key metrics</th>
<th>Tight-fitting</th>
<th>Loose-fitting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Half facepiece</td>
<td>Full facepiece</td>
</tr>
<tr>
<td>Respiratory protection-APF³</td>
<td>50</td>
<td>1000</td>
</tr>
<tr>
<td>Min airflow rate</td>
<td>115 liters per min</td>
<td>115 liters per min</td>
</tr>
</tbody>
</table>

OSHA recommends considering half facepiece, full facepiece, or powered air purifying (with HEPA filter) respirators as PPE options that provide greater protection and improved worker comfort relative to the N95 respirator¹

Tight-fitting facepieces and PAPRs may be more comfortable than disposable respirators for longer duration use, or if the user sweats heavily during work

Use of tight-fitting PAPRs requires fit testing; use of loose-fitting PAPRs does not require fit testing⁵

PAPRs protect the user by filtering out contaminants in the air and use a battery-operated blower to provide the user with clean air; this has a secondary effect of cooling the user, which is helpful in higher temperature operations, such as welding

Durable respirators may provide better fit than N95 respirators for users with facial hair

NIOSH and OSHA recommend routinely cleaning and disinfecting durable respirators⁶

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². Powered Air-Purifying Respirator  
³. Assigned protection factor, a term used by OSHA to determine how well a respirator/filter combination will protect an individual from external contaminants; an APF of 25 means that no more than one-twenty fifth of the contaminants to which the worker is exposed will leak into the inside of the mask, https://affygility.com/potent-compound-corner/2017/10/19/the-proper-use-of-assigned-protection-factors-and-maximum-use-concentrations.html  
⁴. APF of 25 without additional testing  

A. Distinction between respirators and masks

<table>
<thead>
<tr>
<th>NIOSH certified</th>
<th>FDA cleared</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1b</strong> N95 Respirators</td>
<td></td>
</tr>
<tr>
<td><strong>1c</strong> Surgical N95 Respirators</td>
<td></td>
</tr>
<tr>
<td><strong>1c</strong> Surgical masks</td>
<td></td>
</tr>
</tbody>
</table>

- **Tight-fitting face seal**
  - ✓ ✓ ×
- **Fluid resistant**
  - × ✓ ✓
- **Protects others from the wearer’s respiratory emissions**
  - ✓ ✓ ✓

CDC guidance for respirators:

- Non-surgical N95 respirators provide sufficient protection for health care providers against COVID-19 in most settings.\(^1\)
- HCPs who are working in a sterile field or who may be exposed to high velocity splashes, sprays, or splatters of blood or body fluids should wear surgical respirators.\(^1\)

OSHA guidance on lower risk tasks (i.e., low to medium):

- The PPE ensemble could include a face mask (e.g., surgical mask).\(^2\)
- In rare situations would a respirator be required?\(^2\)

---

1. https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/default.html

B: Product breakdown for N95 respirators

Product breakdown for N95 Respirators

Spun-bond meltblown spunbond is 3-layer fabric that can be made inline or on separate extruders.

All the raw fabric materials except the filter media should be relatively straightforward to replicate across non-woven synthetic fabric mills.

Filter media is significantly capacity constrained.

Filtered air with 95% of >0.3 micron particles removed

Unfiltered air

Outer cover web
Polypropylene spun-bond

Filter media
Polypropylene meltblown
Extrusion die, collector design, configuration, and know-how are proprietary

Inner cover web
Polypropylene spun-bond


Source: Derived from expert manufacturing interviews; graphic and technical specifications from a N95 manufacturer; image courtesy of Cambridge Mask

McKinsey & Company 93
### B: Supply of N95 respirators is limited, constrained by the specialized SMS fabric and thermoform process

<table>
<thead>
<tr>
<th>Process step</th>
<th>Capacity</th>
<th>Output</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Refinery</strong></td>
<td><img src="Refinery.png" alt="Image" /></td>
<td>High grade polypropylene</td>
<td>Example refineries capable of high grade PP: Exxon, Chevron, Sinopec</td>
</tr>
<tr>
<td><strong>SMS (spunbond-meltblown-spunbond) mill</strong></td>
<td><img src="SMS.png" alt="Image" /></td>
<td>SMS roll stock (N95 quality)</td>
<td>Example mills (at capacity): SWM, 3M, Kimberly Clark, Transweb, Mytrex, Lydall, PFNonwovens, N95 capable equipment: Reifenhäuser Reicofil (3.5mo lead time), Oerlikon</td>
</tr>
<tr>
<td><strong>Respirator thermoform converter</strong></td>
<td><img src="Respirator.png" alt="Image" /></td>
<td>Finished N95 respirator</td>
<td>Example converters: Sunwell, 3M, Honeywell, Xinglong,</td>
</tr>
</tbody>
</table>

Source: Collected through interviews with experts in the PPE manufacturing industry

---

**Description of other options**

- N95-equivalent or near-equivalent respirators from other countries
- Surgical masks

**Reduction in demand, such as re-use**
B: In crisis scenarios, CDC guidance indicates approved respirators under standards similar to NIOSH can be used.

<table>
<thead>
<tr>
<th>Country</th>
<th>Performance Standard</th>
<th>Acceptable Product Classification</th>
<th>Standards / Guidance Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>ABNT/NBR 13698:2011</td>
<td>PFF3, PFF2</td>
<td>Fundacentro CDU 614.894</td>
</tr>
<tr>
<td>China</td>
<td>GB 2626-2006</td>
<td>KN100, KP100, KN95, KP95</td>
<td>GB/T 18664-2002</td>
</tr>
<tr>
<td>Europe</td>
<td>EN 149-2001</td>
<td>FFP3, FFP2</td>
<td>EN 529:2005</td>
</tr>
<tr>
<td>Korea</td>
<td>KMOEL-2017-64</td>
<td>Special, 1st</td>
<td>KOSHA GUIDE H-82-2015</td>
</tr>
<tr>
<td>Mexico</td>
<td>NOM-116-2009</td>
<td>N100, P100, R100, N99, P99, R99, P95, R95</td>
<td>NOM-116</td>
</tr>
<tr>
<td>US</td>
<td>NIOSH 42 CFR 84</td>
<td>N100, P100, R100, N99, P99, R99, P95, R95</td>
<td>OSHA 29CFR1910.134</td>
</tr>
</tbody>
</table>

C: Although not as effective as N95 respirators, surgical masks block out some aerosol particles

Fit test results are dependent on the structure of the user’s face

Example fit test results

Particles 0.01-1 microns blocked, Percent

<table>
<thead>
<tr>
<th></th>
<th>FFP3 Respirator</th>
<th>N95 Respirator</th>
<th>KN95 Respirator</th>
<th>KN90 Respirator</th>
<th>Non-spec Product A</th>
<th>Non-spec Product B</th>
<th>Surgical Mask</th>
</tr>
</thead>
<tbody>
<tr>
<td>N95 Respirator</td>
<td>99.6</td>
<td>99.1</td>
<td>97.5</td>
<td>92.3</td>
<td>95.2</td>
<td>56.5</td>
<td>63.0</td>
</tr>
<tr>
<td>KN95 Respirator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KN90 Respirator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-spec Product A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-spec Product B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgical Mask</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Specifications for respirators and masks often show filter efficiency, which is the inverse of the particle penetration of the material; a quantitative fit test (i.e., total leakage test), measures the ratio of particles inside the mask, compared to the particles outside the mask for a given user.


C: Surgical masks are designed with rapid mass manufacturing in mind

<table>
<thead>
<tr>
<th>5 components of surgical masks</th>
<th>One customized machine cuts and bonds the 3 layers in 1 process</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 protective layers</td>
<td><strong>Material feed</strong> 3 fabrics are fed into the machine from rollers</td>
</tr>
<tr>
<td>1. Inner layer</td>
<td><strong>Layering</strong> Fabrics are laid in the desired accordion structure</td>
</tr>
<tr>
<td>Material: Spunbonded non-woven fabric (Same material as the outside of disposable ice bag)</td>
<td><strong>Edge bonding</strong> Edges of the mask are bonded using ultrasonic bonding machines or adhesives (ultrasonic provides stronger and more hygienic seal)</td>
</tr>
<tr>
<td>Function: Enhance wearer's comfort.</td>
<td><strong>Die cut</strong> The masks are stamped in the desired shape</td>
</tr>
<tr>
<td>2. Center layer</td>
<td><strong>Component bonding</strong> Metal nose bands and elastic ear loops are placed and ultrasonic bonded</td>
</tr>
<tr>
<td>Material: Polypropylene SMS non-woven fabric</td>
<td></td>
</tr>
<tr>
<td>Function: Filter particles and bacteria according to the ASTM standards</td>
<td></td>
</tr>
<tr>
<td>3. Outer layer</td>
<td></td>
</tr>
<tr>
<td>Material: Spunbonded non-woven fabric</td>
<td></td>
</tr>
<tr>
<td>Function: Less soft than the inner layer, holds the desired color and is coated for fluid resistance</td>
<td></td>
</tr>
<tr>
<td>2 structural components</td>
<td></td>
</tr>
<tr>
<td>4. Metal nose band</td>
<td></td>
</tr>
<tr>
<td>5. Elastic ear loops</td>
<td></td>
</tr>
</tbody>
</table>

Source: Collected through interviews with experts in the PPE manufacturing industry | Image: Collected from experts in the PPE manufacturing industry
D: CDC guidance for cloth face coverings

Cloth face coverings should
- Fit snugly but comfortably against the side of the face
- Be secured with ties or ear loops
- Include multiple layers of fabric
- Allow for breathing without restriction
- Be able to be laundered and machine dried without damage or change to shape

CDC recommends
- Wearing cloth face coverings in public settings where other social distancing measures are difficult to maintain (e.g., grocery stores and pharmacies), especially in areas of significant community-based transmission.
- CDC also advises the use of simple cloth face coverings to slow the spread of the virus and help people who may have the virus and do not know it from transmitting it to others. Cloth face coverings fashioned from household items or made at home from common materials at low cost can be used as an additional, voluntary public health measure.
- Cleaning the cloth face covering in a washing machine
- Taking care when removing the covering to not touch eyes, nose, or mouth, and wash hands immediately after removing

The cloth face coverings recommended are not surgical masks or N-95 respirators. Those are critical supplies that must continue to be reserved for healthcare workers and other medical first responders, as recommended by current CDC guidance.

Instructions provided for 3 types

1. Sewn cloth face covering
   - Materials
   - Two 10”x6” rectangles of cotton fabric
   - Two 6” pieces of elastic (or rubber bands, string, cloth strips, or hair ties)
   - Needle and thread (or bobby pin)
   - Scissors
   - Sewing machine
   - Steps
   - Cut out two 10-by-6-inch rectangles of cotton fabric
   - Run a 6-inch length of 1/8-inch wide elastic through the wider hem on each side of the mask
   - Fold over the long sides ¼ inch and hem. Then fold the double layer of fabric over ½ inch along the short sides and stitch down.
   - Gently pull on the elastic so that the knots are tucked inside the hem. Gather the sides of the mask on the elastic and adjust so the mask fits your face. Then securely stitch the elastic in place to keep it from slipping

2. Quick cut T-shirt covering (new sew method)
   - Materials
   - T-shirt
   - Scissors

3. Bandana Face Covering (no sew method)
   - Materials
   - Bandana (or square cotton cloth approximately 20’x20’)
   - Rubber bands (or hair ties)
   - Scissors

Some non-medical applications for goggles were observed in cases but none for face-shields

<table>
<thead>
<tr>
<th>Critical supply</th>
<th>Materials</th>
<th>COVID-19 applicability</th>
<th>Re-use</th>
<th>Observed in “return to work” case studies²</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goggles</strong> (not safety glasses)</td>
<td>Hard plastic (PVC, polycarbonate)</td>
<td>Provides the most reliable practical eye protection from splashes, sprays, and respiratory droplets</td>
<td>Reusable for long periods of time if properly sanitized (several weeks)</td>
<td>Select applications observed</td>
</tr>
<tr>
<td></td>
<td>Typically covers sides and above eyes</td>
<td>Must be snugly fit across the brow to provide best protection</td>
<td>Manufacturers can apply anti scratch coatings or use thicker gauge plastic in order to extend life¹</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Goggles should be appropriately fitted, indirectly-vented, with a manufacturer’s anti-fog coating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Face-shield</strong></td>
<td>Soft plastic (PVC, polycarbonate, polyethylene)</td>
<td>Used in higher risk COVID-19 environments that will expose wearer to fluid splashes (e.g., intubations, vomiting patient, etc.)</td>
<td>Typically reusable for short periods of time if properly sanitized (2-3 days)</td>
<td>No applications observed</td>
</tr>
<tr>
<td></td>
<td>Provides additional protection to other facial areas and neck</td>
<td>Face shield usability is determined by wearer (i.e., view is clear of obstruction, no limiting scratches or damage)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ANSI Z87.1 D3 defines design requirements for eye protection that protects against splash, droplets, and sprays

1. Derived from health care expert interview
2. Industry and PPE expert interviews

Source: CDC; Hospital Supply Chain expert interviews; Industry expert interviews; images courtesy of 3M, CDC
### Different protective equipment used across industries

#### Medical
- **Isolation gown (SMS)**
- **Surgical gown (AAMI Class 2-4)**
- **Cleanroom Frock (SMS/Polyester)**
- **Chemical resistant coverall (HDPE/Tyvek)**
- **Chemical resistant apron**
- **Disposable Apron (nylon/PVC)**

#### Chemical/industrial
- **Cleanroom ESD Smock (SMS/Polyester)**
- **Lab Coat (polyester)**
- **Chemical resistant apron**
- **Cleanroom Frock (SMS/Polyester)**
- **Disposable Apron**
- **Smock (SMS/Polyester)**

#### Industrial
- **Cleanroom Frock**
- **Cleanroom ESD Smock (SMS/Polyester)**
- **Lab Coat (polyester)**
- **Chemical resistant apron**
- **Cleanroom Frock (SMS/Polyester)**
- **Disposable Apron**

#### Limited non-medical applications of gowns / body protection observed in cases

<table>
<thead>
<tr>
<th>Ability to meet AAMI Level 1 Protection¹</th>
<th>Protection²</th>
<th>Reuse or cleaning potential²</th>
<th>Long-term comfort, breathability</th>
<th>Ease of manufacture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolation gown (SMS)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Surgical gown (AAMI Class 2-4)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cleanroom Frock (SMS/Polyester)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Chemical resistant coverall (HDPE/Tyvek)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Chemical resistant apron</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Disposable Apron (nylon/PVC)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cleanroom ESD Smock (SMS/Polyester)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Chemical resistant apron</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cleanroom Frock (SMS/Polyester)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Disposable Apron</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

### Notes:
1. Unless otherwise certified, these may meet at least AAMI Class I. However, this needs to be validated; AAMI Level 1 is a measure of liquid barrier performance and expected barrier effectiveness is "Minimal water resistance (some resistance to water spray)"
2. Includes multiple uses and/or cleanability
3. Qualitative assessment from one concept review based on material technical data sheets – criteria and assessment needs to be validated by any potential user

Source: [https://www.health.state.mn.us/facilities/patientsafety/infectioncontrol/ppe/ppewebinar.pdf](https://www.health.state.mn.us/facilities/patientsafety/infectioncontrol/ppe/ppewebinar.pdf); Industry expert interviews

DOCUMENT INTENDED TO PROVIDE INSIGHT BASED ON CURRENTLY AVAILABLE INFORMATION FOR CONSIDERATION AND NOT SPECIFIC ADVICE CONFIDENTIAL AND PROPRIETARY
# CDC recommends nitrile and latex gloves for OSHA-equivalent high-risk activities

<table>
<thead>
<tr>
<th>Disposable glove material</th>
<th>Characteristics</th>
<th>Applications</th>
<th>Relative unit cost</th>
<th>Scarcity</th>
</tr>
</thead>
</table>
| Nitrile                   | Stronger than latex or vinyl, with fit, feel, and comfort rivaling that of latex. 3x puncture resistance and higher abrasion and chemical resistance than latex. | • Medical  
• Customer services (e.g., security, tattoo artists, salon)  
• Industrial (e.g., automotive, manufacturing, janitorial, plumbing, paint shop, chemical, food processing) | Higher | Moderate |
| Latex                     | Most elastic, resilient, and consistent-fitting glove material; more flexible and offers greater tactile sensitivity than nitrile  
Latex allergies in <1% of US population | • Medical (e.g., examination, laboratory)  
• Industrial (e.g., automotive, janitorial, paint shops, printing) | Middle | Moderate |
| Vinyl                     | Comfortable fit that is looser than latex or nitrile; economical option where frequent glove changes are required | • Medical  
• Industrial (e.g., food service) | Lower | Moderate |
| Polyethylene              | Most affordable glove material, good for short duration tasks and frequent glove changes | • Customer service (e.g., salon, cosmetics)  
• Industrial (e.g., food service)  
• Arts and crafts | Lowest | Low |

1. AMMEX glove guide – April 2019  
2. High scarcity = low availability  
Source: CDC; FDA; US National Library of Medicine – National Institutes of Health; collected from health care PPE and manufacturing expert interviews; https://www.ammex.com/download-glove-guide/  

CDC recommends for high-risk medical applications, (i.e., caring for suspected or confirmed COVID-19 patients)  

McKinsey & Company
Wide-range of sanitizers and disinfectants used for COVID-19

<table>
<thead>
<tr>
<th>Critical supply</th>
<th>CDC recommended</th>
<th>Additional comments from CDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soap and water</td>
<td>Any soap, applied for 20 seconds&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Wash your hands often with soap and water for at least 20 seconds especially after you have been in a public place, or after blowing your nose, coughing, or sneezing&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Hand sanitizers</td>
<td>Alcohol&lt;sup&gt;2&lt;/sup&gt; Ethanol (&gt;60% concentration) Isopropanol (&gt;70%)</td>
<td>Alcohol based hand rubs are recommended over hand washing in most cases because they are less damaging to skin and achieve greater compliance&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Non-alcohol Benzalkonium chloride Benzethonium chloride Chloroxylenol Povidone-iodine Others</td>
<td>Available evidence indicates benzalkonium chloride has less reliable activity against coronavirus than either of the alcohols&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Equipment / surface disinfectants&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Chlorine bleach Alcohol Hydrogen peroxide Ammonia Others</td>
<td>Practice routine cleaning of frequently touched surfaces (e.g., tables, doorknobs, light switches, handles, desks, toilets, faucets, sinks, and electronics) with household cleaners and EPA-registered disinfectants that are appropriate for the surface, following label instructions</td>
</tr>
</tbody>
</table>


Alcohol is an effective antiviral because it denatures the structure of proteins, including the envelope of viruses<sup>4</sup>

While there may be sourcing challenges for ABHRs are a relatively simple formulation of commodity chemicals (see next page)
# Product breakdown: alcohol-based hand rub (ABHR) raw material inputs

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Ethyl alcohol</th>
<th>Isopropyl alcohol</th>
<th>Glycerol (glycerin)</th>
<th>Hydrogen peroxide</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FDA guidance</strong>¹</td>
<td>Denatured, at least 94.9% ethanol by vol</td>
<td>No specifications</td>
<td>Food grade³</td>
<td>Concentrate USP or Topical Solution USP</td>
</tr>
<tr>
<td><strong>WHO guidance</strong>²</td>
<td>Ethanol 96%</td>
<td>Isopropyl alcohol 99.8%</td>
<td>Glycerol 98%</td>
<td>Hydrogen peroxide 3-6%</td>
</tr>
</tbody>
</table>

1. [https://www.fda.gov/media/136289/download](https://www.fda.gov/media/136289/download)
2. [https://www.who.int/gpsc/5may/Guide_to_Local_Production.pdf](https://www.who.int/gpsc/5may/Guide_to_Local_Production.pdf)
3. Meets United States Pharmacopoeia (USP) or Food Chemical Codex (FCC) grade requirements
4. FDA guidelines have been endorsed by the WHO and CDC

ABHR is made up of commodity chemicals that meet United States Pharmacopoeia (USP) or Food Chemical Codex (FCC) standards.

As an alternative to traditional sourcing, the FDA has provided guidelines for new producers to make alcohol-based hand rub.

Source: FDA Policy for Temporary Compounding of Certain Alcohol-Based Hand Sanitizer Products During the Public Health Emergency Immediately Effect Guidance for Industry (as of March 27 2020), WHO-recommended Handrub Formulations; CDC

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document intended to provide insight based on currently available information for consideration and not specific advice