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.

Read more on McKinsey.com
Context & how to use this document

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

5 phases of the workforce journey, and

8 levers of protection,

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

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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
- Masks and other appropriate PPE required at all times
- Clear posters on safety guidance and sickness protocols
- Improved air filtration/ventilation

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

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

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: Retail environment

Travel to work and pre-entry

- Staggered entry and work shifts

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)

Additional guidance:
- Staggered entry and work shifts
- Increased cleaning of high-touch surfaces and spaces (e.g., Bathrooms)
- Plexiglass shields installed at cash registers
- Sick leave guidance

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.
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

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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
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

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.

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 employees have completed all return to work trainings prior to entry

COVID-19 prevention - TEST

SYMPTOMS AWARENESS
- Main symptoms
- Self-contingency measures
- Protecting others

WORKPLACE ENVIRONMENT
- Company policy
- Work permits
- Live assistance

PERSONAL HYGIENE
- Shop floor
- Meeting room
- Restroom

OUTSIDE WORKPLACE
- Tips

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

Increase awareness
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
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
Travel to work
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

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
Stagger entry for employees and customers

Where this has been done
Grocery stores in the US
Restaurants and museums in China, S. Korea

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

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
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)

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.
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

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

Where this has been done

Grocery stores in the US
Corporate offices in China and S. Korea

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

Where this has been done
Aerospace manufacturer in China
Utilities companies, power plants and market operators in the U.S

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

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 disinfectants as well as disinfected bags, carts and trolleys at entry

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

Where this has been done

Grocery stores 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
Separate hours for vulnerable populations

Dedicated shopping 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.

*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 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

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 (2/2)

Details in Appendix

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<td><img src="image9.png" alt="Image" /></td>
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**Use protective equipment**

**Office**

- 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)

**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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\(^1\) 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.

*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.
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 (e.g., Guided meditations)

**Where this has been done**

- Corporations in the U.S.
- Multinational coffee house
- American financial services company

*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

Clearly denote expected practices

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

**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

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

Use protective equipment

Source: Expert interviews, press search, client surveys

**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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**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 (2/2)

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Infrequent use of respirators and gowns in medium risk category\(^1\)

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.

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.
Limit sharing and disinfect PPE at regular intervals

Provide mask disinfection cabinets

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

Separate in space & time
Office

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

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 “remote-first” practices to improve culture for remote colleagues

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

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

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
Group employees into critical function teams, operating pods or work shifts (1/2)

Operating Pod 1

Operating Pod 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
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)

Where this has been done
Factories in China have used partitions to split projects into smaller groups

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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
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

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 one-way store aisles with fewer sales specialists

One-way aisles

Reduced numbers of sales specialists

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.

Where this has been done

Grocery stores in China/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.
Reduce in-store services with high contact

Drive safe behavior norms

Office | Field

Description of potential intervention

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

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 between customers

Queue for fitting room

Ensure physical separation between customers

Spacing between employees and customers

Where this has been done

Grocery stores in the U.S.

Multinational retail stores in China

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

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

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 larger gatherings/meetings of employees

Encourage video/audio calls

Limit larger gatherings/meetings of employees

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

Description of potential intervention

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)

Drive safe behavior norms

Repurpose conference rooms

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
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.

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 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.

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.
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
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

Where this has been done

Implemented at several grocery stores and select retail stores in North America and China

Description of potential intervention

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

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
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.

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
Alter return and cancellation policies

**Description of potential intervention**

**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

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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
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.
Issue clear guidance on sick leave, compensation and related policies

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 policies 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
Common space
Identify high risk areas based on a walkthrough assessment

Drive safe behavior norms

Where this has been done

Multinational aerospace manufacturer

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

Third party walk-through

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
Remove or replace high-touch communal resources

Replace coffee dispensers

Installing motion sensing water filling stations

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

- 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

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

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
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

*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 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

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 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

HEPA (high-efficiency particulate air)-rated filter

Ensure airflow does not aid transmission through droplets

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.

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 (1/2)

Visible cleaning schedules displayed

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

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

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.
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.
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

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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*
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" alt="Respirators and masks" /></td>
<td><img src="image2" alt="Gowns" /></td>
<td><img src="image3" alt="Eye protection" /></td>
<td><img src="image4" alt="Gloves" /></td>
</tr>
<tr>
<td>Medium Risk</td>
<td><img src="image5" alt="Respirators and masks" /></td>
<td><img src="image6" alt="Gowns" /></td>
<td><img src="image7" alt="Eye protection" /></td>
<td><img src="image8" alt="Gloves" /></td>
</tr>
<tr>
<td>Low Risk</td>
<td><img src="image9" alt="Respirators and masks" /></td>
<td><img src="image10" alt="Gowns" /></td>
<td><img src="image11" alt="Eye protection" /></td>
<td><img src="image12" alt="Gloves" /></td>
</tr>
</tbody>
</table>

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.

\(^1\) 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.

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)

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

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

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

Term definitions:
- Post-infection: After the infection phase.
- Pre-entry: Before entering the workplace.
- At Work: During work hours.
- Common areas: Shared spaces like lobbies and hallways.
- Field: Outdoor work environments.

Increase awareness

Office | Field

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

Source: Expert interviews, press search, client surveys

Press Note: 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 lunch hours and time spent in common areas

Staggered lunch schedule

Extended cafeteria operating hours

Separate in space & time

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

Description of potential intervention

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

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

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

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

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 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

Description of potential intervention

Collect suggestions/concerns from employees and prominently display FAQ

Setup a hotline for employees to report hygiene violations/concerns

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
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></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>• Can filter &gt;95% of particles &gt;0.3 microns</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></td>
<td>• Good face seal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half facepiece</td>
<td></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></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</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</td>
</tr>
<tr>
<td></td>
<td>• Loose face seal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>While a loose face seal blocks fewer particles it improves breathability</td>
</tr>
<tr>
<td>Non-spec products</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\(^1\)

<table>
<thead>
<tr>
<th>Key metrics</th>
<th>Tight-fitting</th>
<th>Loose-fitting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory protection-APF(^3)</td>
<td>Half facepiece</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Full facepiece</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>

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 testing\(^5\).

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 respirators\(^6\)

---

A. Distinction between respirators and masks

- **NIOSH certified**
  - N95 Respirators
  - Surgical N95 Respirators

- **FDA cleared**
  - Surgical masks

<table>
<thead>
<tr>
<th>Tight-fitting face seal</th>
<th>✓</th>
<th>✓</th>
<th>×</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid resistant</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Protects others from the wearer’s respiratory emissions</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

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

**CDC guidance for respirators:**
- Non-surgical N95 respirators provide sufficient protection for health care providers against COVID-19 in most settings
- 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

**OSHA guidance on lower risk tasks (i.e., low to medium):**
- The PPE ensemble could include a face mask (e.g., surgical mask)
- In rare situations would a respirator be required

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

Inner cover web
Polypropylene spun-bond

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

Not exhaustive


Source: Derived from expert manufacturing interviews; graphic and technical specifications from a N95 manufacturer; image courtesy of Cambridge Mask
### 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>Refinery</td>
<td>No constraint</td>
<td>High grade polypropylene</td>
<td>Example refineries capable of high grade PP: Exxon, Chevron, Sinopec</td>
</tr>
<tr>
<td>SMS (spunbond-meltblown-spunbond) mill</td>
<td>Extreme constraint</td>
<td>SMS roll stock (N95 quality)</td>
<td>Example mills (at capacity): SWM, 3M, Kimberly Clark, Transweb, Mytrex, Lydall, PFNonwovens, N95 capable equipment: Reiftenhauser Reicofil (3.5mo lead time), Oerlikon</td>
</tr>
<tr>
<td>Respirator thermoform converter</td>
<td>Moderate constraint</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>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>
<td></td>
</tr>
</tbody>
</table>

There are studies that successfully demonstrate a certain degree of efficacy of surgical masks despite the facial seal factors.

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.


   [https://multimedia.3m.com/mws/media/957730O/respirators-and-surgical-masks-contrast-technical-bulletin.pdf](https://multimedia.3m.com/mws/media/957730O/respirators-and-surgical-masks-contrast-technical-bulletin.pdf)
C: Surgical masks are designed with rapid mass manufacturing in mind

5 components of surgical masks

3 protective layers

1. **Inner layer**
   - Material: Spunbonded non-woven fabric (Same material as the outside of disposable ice bag)
   - Function: Enhance wearer's comfort.

2. **Center layer**
   - Material: Polypropylene SMS non-woven fabric
   - Function: Filter particles and bacteria according to the ASTM standards

3. **Outer layer**
   - Material: Spunbonded non-woven fabric
   - Function: Less soft than the inner layer, holds the desired color and is coated for fluid resistance

2 structural components

4. **Metal nose band**
5. **Elastic ear loops**

One customized machine cuts and bonds the 3 layers in 1 process

<table>
<thead>
<tr>
<th>Component bonding</th>
<th>Metal nose bands and elastic ear loops are placed and ultrasonic bonded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Die cut</td>
<td>The masks are stamped in the desired shape</td>
</tr>
<tr>
<td>Edge bonding</td>
<td>Edges of the mask are bonded using ultrasonic bonding machines or adhesives (ultrasonic provides stronger and more hygienic seal)</td>
</tr>
<tr>
<td>Layering</td>
<td>Fabrics are laid in the desired accordion structure</td>
</tr>
<tr>
<td>Material feed</td>
<td>3 fabrics are fed into the machine from rollers</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
   a) Cut out two 10-by-6-inch rectangles of cotton fabric
   b) Run a 6-inch length of 1/8-inch wide elastic through the wider hem on each side of the mask
   c) 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.
   d) 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>
</table>
| **Goggles** (not safety glasses) | Hard plastic (PVC, polycarbonate)  
Typically covers sides and above eyes  
Goggles should be appropriately fitted, indirectly-vented, with a manufacturer’s anti-fog coating | Provides the most reliable practical eye protection from splashes, sprays, and respiratory droplets  
Must be snugly fit across the brow to provide best protection | Reusable for long periods of time if properly sanitized (several weeks)  
Manufacturers can apply anti scratch coatings or use thicker gauge plastic in order to extend life¹ | Select applications observed |
| **Face-shield** | Soft plastic (PVC, polycarbonate, polyethylene) | Used in higher risk COVID-19 environments that will expose wearer to fluid splashes (e.g., intubations, vomiting patient, etc.)  
Provides additional protection to other facial areas and neck | Typically reusable for short periods of time if properly sanitized (2-3 days)  
Face shield usability is determined by wearer (i.e., view is clear of obstruction, no limiting scratches or damage) | No applications observed |

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

**Note:**
ANSI/AAMI PB70 is a standard that evaluates the barrier effectiveness of surgical gowns and isolation gowns.

<table>
<thead>
<tr>
<th>Medical</th>
<th>Chemical/industrial</th>
<th>Industrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolation gown (SMS)</td>
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### Ability to meet AAMI Level 1 Protection

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### Reuse or cleaning potential

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### Long-term comfort, breathability

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### Ease of manufacture

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

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

Current as of April 6, 2020
# CDC recommends nitrile and latex gloves for OSHA-equivalent high-risk activities

<table>
<thead>
<tr>
<th>Disposable glove material</th>
<th>Characteristics(^1)</th>
<th>Applications</th>
<th>Relative unit cost</th>
<th>Scarcity(^2)</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 |
| Poly-ethylene             | 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 |

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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/](https://www.ammex.com/download-glove-guide/)

CDC recommends for high-risk medical applications, (i.e., caring for suspected or confirmed COVID-19 patients)\(^3\)

McKinsey & Company  
Current as of April 4, 2020
## 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</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></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>

3. [https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2](https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2)
4. [https://www.cdc.gov/infectioncontrol/guidelines/disinfection/disinfection-methods/chemical.html](https://www.cdc.gov/infectioncontrol/guidelines/disinfection/disinfection-methods/chemical.html)

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)

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3. [https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2](https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2)
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# Product breakdown: alcohol-based hand rub (ABHR) raw material inputs

<table>
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<tr>
<th>Purpose</th>
<th>Ethyl alcohol</th>
<th>OR</th>
<th>Isopropyl alcohol</th>
<th>Glycerol (glycerin)</th>
<th>Hydrogen peroxide</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>Antiseptic</td>
<td></td>
<td>Antiseptic</td>
<td>Humectant (skin care)</td>
<td>Antibacterial for solution</td>
</tr>
<tr>
<td><strong>FDA guidance</strong></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>
<td></td>
</tr>
<tr>
<td><strong>WHO guidance</strong></td>
<td>Ethanol 96%</td>
<td>Isopropyl alcohol 99.8%</td>
<td>Glycerol 98%</td>
<td>Hydrogen peroxide 3-6%</td>
<td></td>
</tr>
</tbody>
</table>

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.

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

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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**Purpose**: Antiseptic

**Ethyl alcohol**

Denatured, at least 94.9% ethanol by vol

**Isopropyl alcohol**

No specifications

Food grade³

Concentrate USP or Topical Solution USP

**Glycerol (glycerin)**

Meets United States Pharmacopoeia (USP) or Food Chemical Codex (FCC) grade requirements

**Hydrogen peroxide**

Food grade³ - 6%