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PUBLIC BUS OPERATIONS
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About the document

“COVID-19: Safety measures for public bus operations in India” was developed by the WRI India Ross Center for Sustainable Cities in June 2020 to provide bus operators practical recommendations to safely re-open public bus services for passenger commute in India.

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INTRODUCTION

As India grows, so does its need for effective and integrated public transport. Prior to the COVID-19 pandemic, and the associated lockdown, India's public bus system catered to over 70 million people for their daily commute.

With the onset of the COVID-19 pandemic, public transportation across the country effectively stopped. As public and shared modes of transport move large volumes of people, traveling, inevitably, involves interactions with large numbers of common surfaces and also run the risk of close-quarter interaction between commuters and transit staff.

At the time of writing, it has been more than two months since the lockdown began. Currently, lockdown restrictions are easing across India--but the number of cases is still growing, and all districts in major Indian cities have been classified as red zones. While a majority of the corporate sector seems to have adapted to working from home, other sectors such as manufacturing and retail, require employees to travel to work. With the aim of economic recovery, while limiting the spread of disease, safety measures for public transport will play a critical role in providing people access to livelihoods.

Without an effective roadmap to recovery for public transport, Indian cities risk becoming choked with traffic and congestion as commuters flock toward private vehicles while causing an immense equity issue with many commuters unable to afford a private vehicle, curtailing their ability to perform day-to-day activities. Indian public bus agencies, thus, need to transform their traditional models of operation to ensure the safety of commuters and staff, and thus, build confidence among transit users and retain ridership.

Transit staff safety is also of critical importance for the continued operation of services. Resources should be equally focused on protecting employees, including maintenance staff and transport crew, as they form the backbone of the transit system. This will help to build trust between the agency and commuters, while also strengthening safety practices to ensure minimal staff shortage.

This guideline document presents an effective response mechanism in the wake of the COVID-19 pandemic. It presents a framework to help prepare bus operations, following the emergency response phase of the pandemic and includes guidelines catered to Indian contexts, based on the best practices adopted by cities around the world. A comprehensive framework will help prepare for various scenarios, build resilience within the system, and instill trust in commuters—all of which will translate into better ridership in the transition out of these unprecedented times.
Key Recommendations for Public Safety in Bus Operations During the COVID-19 Pandemic

Before operation

- All staff involved with bus operations must undergo a health check for COVID symptoms before returning to service
- Transit agencies must procure PPE kits, sanitizers, and disinfectants, based on practical estimates
- Sanitization plans should be developed for buses and interchanges
- Drivers, conductors, and other staff involved in operations, maintenance, and management of buses and terminals must undergo training on safety standards
- Passenger gathering areas, at bus stops, ticketing counters, and others, should be clearly marked out as per social distancing norms
- A bus operational plan should be created, which shall include route-wise fleet deployment and a contactless ticketing plan

During operation

- Only passengers wearing a mask or a cloth covering their nose and mouth should be allowed to board
- Contactless payment methods should be set up. While digital payment is the preferred mode, small value passes and fare collection boxes may be used as alternatives.
- Cash could be accepted in some cases, but with precautions to minimize any direct contact
- Thermal screening of passengers should be carried out for bus stops around containment zones
- Buses should be disinfected regularly, and cleaning must be carried out multiple times a day

Post operation

- Install thermal scanners at key bus terminals and interchange stations
- Set up a monitoring plan to ensure compliance with safety measures
- Ensure regular inventory and restocking of PPE kits, sanitizers, and disinfectants
- Periodic checkup of staff for COVID-19 symptoms
- Promote regular internal and external communication around hygiene and safe transit usage
COVID-19: Safety measures for public bus operations in India

Background

Around 46% of urban passenger trips are serviced by public buses, making it one of the most commonly used modes of transport in India\(^1\). Buses are also confined spaces, with a variety of common surfaces that commuters and staff are in contact with, a lack of adequate ventilation, and the inability to identify infected persons. As a result, public bus systems become high-risk environments for the spread of diseases such as the novel coronavirus\(^2\).

As cities start emerging from the COVID-19–mandated lockdowns, the initial months will be crucial to prevent a second wave of infections. With a relaxation of strict restrictions on people's movement and activities, urban travel will slowly resume its normal intensity. The perceived risk of being infected while using public transit may drive up private vehicle usage, which in turn will have adverse effects on traffic congestion, air pollution, environmental degradation, and the overall quality of urban life. Transit agencies will need to proactively implement rigorous safety measures to counter the spread of the disease and instill confidence in commuters through clear communication campaigns.

This document has been created to help public transit agencies craft effective responses in the wake of the COVID-19 pandemic. It presents a framework to help prepare bus operations to open their doors to commuters, following the emergency response phase of the pandemic.

It includes guidelines based on the best practices adopted by cities around the world while incorporating recommendations put forth by national and international health agencies. These measures will need to be followed until further relaxation of social distancing norms. As the timeline for this continues to be uncertain, it is important for transit agencies to work closely with health departments at the national and state level to understand the situation better and implement measures accordingly.

Context

The coronavirus is a respiratory virus that spreads primarily through droplets discharged from the mouth or nasal tract of infected people, during coughing, sneezing, and talking, among other activities\(^3\). Studies have found that the virus survives in aerosols for up to three hours, on copper surfaces for four hours, cardboard for 24 hours, and on plastic and stainless-steel surfaces for two to three days\(^4\).

The World Health Organization (WHO) and the US Centers for Disease Control (CDC) have prescribed social distancing norms, which involves maintaining a minimum distance of at least 3 feet from other people, as one of the most important measures to prevent the spread of the disease.
Recommendations for public transportation services:

The key areas of action to be considered by public bus agencies to limit the risk of disease contraction and spread in the post-COVID-19 phase will be similar to those considered during the pandemic response. These include:

1. Limiting commuter interaction on and off the bus
2. Protecting crew on the bus
3. Adapting bus services and operations
4. Sanitizing buses, bus stops, and waiting areas
5. Protecting and training depot and maintenance staff

These guidelines are suggestive and may be modified as per recommendations of the national government, state governments, health departments, or the National Centre for Disease Control. Additionally, other stakeholders, such as private players and NGOs, could play a role in assisting transit agencies with these recommendations.
1. Limiting commuter interaction on and off the bus

Commuters interact with bus infrastructure in three stages: while waiting at bus stops or terminals, boarding and alighting from buses, and standing or sitting inside the bus. The following measures will help restrict commuter interaction and the spread of the virus while using the public bus system.

a. Safety measures while waiting at bus stops and terminals:

- **Delineate safe waiting locations:** Transit agencies should mark safe distances for commuters at bus stops. Queues must also be marked for safety during boarding. With bus stops servicing multiple destinations, marking sections with different colors for different destinations should be explored to discourage commuters from congregating together.

- **Introduce entry restrictions and thermal scanners:**
  
  o The crew should be deployed at high-traffic bus stops and at terminals to ensure social distancing is maintained while boarding buses. Detailed advice on maintaining social distancing on board the bus is available in the operations section.

  o Equip dedicated staff with thermal scanners to conduct random temperature checks on passengers throughout the day: at boarding points and on-board the bus. Priority for thermal scanners should be in high-traffic zones--either at terminal points or on high-frequency routes. This is to ensure that passengers are not actively displaying symptoms of COVID-19. Thermal scanners must be placed at all bus terminal entries, and the entry of commuters must be restricted accordingly.

Figure 2: Clear marking and communication will help commuters follow social distancing at bus stops.
Image Credit: WRI India
• **Manage crowds effectively at bus terminals:** Transit agencies should mark movement areas and directions within terminals through signs and on-ground marking to streamline the movement of commuters and avoid crowding in any area.

• **Provide easy-to-understand communication at bus stops & terminals:** Social distancing and hygiene measures must be communicated and actively monitored at waiting areas, washrooms, and platforms of bus terminals through posters, stickers, and signs. Agencies can also leverage the support of NGOs and community groups to support their safety measures in and around bus stops through communication campaigns.

• **Purchase of goods & exchange of currency:** Sale of unsealed food must be banned in terminals. Eating food at terminals or on the bus should also be prohibited during this phase. Contactless payment modes must be adopted for all transactions. These can be through digital payment systems, or through cash boxes wherein the commuters tender exact change.

b. **Safety precautions while on-board the bus:**

• **Make personal protective equipment**⃣ **compulsory:** All bus users should be encouraged to maintain personal hygiene. The use of personal protective equipment (PPE), such as gloves and masks, must be mandatory on buses⃣. Access to bus services must be denied for commuters without the appropriate PPE.

• **Identify where passengers can sit:** Usable seats should be demarcated with stickers/covers. The seats should be selected to ensure enough physical distancing between commuters (3 feet distance). Signs should be placed on seats to indicate that select seats cannot be occupied by passengers. Occupying aisle seats should be avoided.

![Figure 3: Bus operations, including boarding and seating, will need to adapt to social distancing](Image Credit: WRI India)
• **Provide priority seating:** Priority seating should be provided to vulnerable people (aged, pregnant, and children) should the need arise.

• **Mark standing locations clearly:** Commuters should be allowed to stand only in predefined marked locations, selected based on social distancing norms. Standing locations and limits on the number of standing passengers should be reassessed based on the healthcare advisories prescribed by the government and other healthcare organizations.

• **Use thermal scanning for all passengers:** Conductors must use thermal scanners to check the body temperature of all commuters before allowing them entry into the bus, even including those who have been scanned at terminals. People with flu symptoms should be denied entry into the bus.
2. Protecting crew on the bus:\(^7\):

Both bus drivers and conductors must use PPE, as well as have easy access to sanitizers, masks, gloves, and cleaning products, which can ensure their safety.

a. Safety measures for conductors:

- **Maintain hand hygiene**: Conductors must sanitize their hands after performing all checks, both before the start and after the end of the trip, while avoiding any contact between their hands and their faces. Conductors are also advised to sanitize their hands multiple times during the journey, based on contact with the commuters.

- **Use face shields**: In addition to the PPEs mentioned above, conductors must use plastic face shields, as their responsibilities require greater interaction with the commuters.

b. Safety measures for drivers:

- **Isolate the driver cabin**: Measures should be taken to ensure conductors and drivers are physically separated from the flow of passengers. For the driver, this can be done by the installation of clear plastic film to separate the driver cabin from the rest of the bus, while ensuring visibility is still maintained. In the absence of a protective separation, the first three rows behind the driver could be left vacant\(^8\).

- **Avoid seating in the first 3 rows**: If buses do not have inbuilt isolation cabins or cannot accommodate these, the first three rows of the bus should not be occupied by passengers to maintain distance from the drivers.

- **Enforce boarding through the back door**: All boarding must be limited to the back door of the bus to minimize interaction between the driver and commuters. Commuters may exit the bus through the front door.
### 3. Adapting bus services and operations

**a. Limit bus occupancy:**

- **Limit ridership:** Conductors should limit the number of people boarding the buses to only 25% to 30% of the capacity of the bus. With high-frequency services, this could ensure social distancing is maintained inside.

- **Define occupancy limits:** Up to 25 passengers can be accommodated in a standard floor bus (City Ordinary, Metro Deluxe). The occupancy limit on-board should be increased in a phased manner based on advice from local, national, and international healthcare organizations.

**b. Rotate staff in shifts:**

Considering reduced operations and, eventually, a phased increase, transit agencies should split their staff into multiple batches and develop a batch-wise staff schedule. This will ensure that all staff is utilized. The following activities should be implemented:

- **Create new duty rosters:** This will effectively reflect the reduction in service. Staff should be available to allow quick response to overcrowding. New rosters can retain day out duties while eliminating night out, and special off duties. Wherever possible, overtime must be avoided.

- **Protect vulnerable employees:** Consider the deployment of younger staff for customer-facing jobs-- including drivers-- to avoid exposure of staff members who may be more vulnerable to the virus.

- **Act decisively if a positive case is detected:** If any staff member tests positive for the disease, alert and isolate their entire batch, and provide appropriate medical assistance. This will enable tracking and tracing potentially infected staff and ensure the continuation of services, as the schedules of the other batches can be reworked to manage the entire service.

**c. Identifying key routes for operation:**

Transit agencies should roll out services based on a phased approach of relaxing lockdown restrictions, and the operation of industrial activity and establishments in and around the city. Agencies should identify and operate only key routes during the transition phase to minimize movement within the city.

- **Identify trunk services:** Trunk routes serve many popular destinations. Focusing on improving service along these routes can help the city bus service cater to a larger section of society. As the first step in operation planning, identify trunk routes with high occupancy.

- **Locate employment hubs:** As most trips made using public transport in the initial stages of the post-COVID-19 scenario are expected to be work-related trips, transit agencies must first identify industrial and corporate employment hubs in the city that may reopen.
• **Adapt routes**: Based on past transit data and current employment density in these hubs, transit agencies should design new routes or select existing routes, limiting bus stops to only specific accessible locations. While redesigning routes, transit agencies should also take into account disease hotspots and containment zones; operations within confinement zones must be avoided.

• **Prioritize direct services**: Transit agencies should work on implementing point-to-point services, designed based on-demand assessment, to minimize contact between new commuters, and between commuters and the conductor. For direct services, tickets can be issued before boarding the bus.

d. **Increase service frequency**:

Bus service frequency should be adaptive and responsive to the demand to minimize risks of overcrowding (on-board and at bus stops) and to enable commuters to reach their destinations on time. Buses can only be operated at 30% of their capacity; therefore, it will be essential to optimize the services in a phased approach.

• **Operate buses at a higher frequency**: As bus occupancy will be limited to almost one-third the original capacity, routes will need to be operated at an increased frequency (almost 3 to 5 times the normal) to ensure that buses remain effective for commuters to get to their destinations on time.

• **Operate longer routes during off-peak hours**: Running longer bus routes covering larger parts of the city during off-peak periods will enable connectivity while allowing passengers to sit further apart. Assign a mid-route terminal to all routes over 15 km to allow some buses on a given route to start or terminate mid-route based on demand patterns.

e. **Explore contactless fare options**:

Operations should also be planned to allow off-board ticketing, wherever possible, before starting the trip. Agencies must try to avoid cash transactions inside the bus. In cases when collecting the fare off-board the bus is not possible, the following measures may be employed:

• **Restructure fares**: Agencies should consider restructuring their fares to simpler denominations of INR 5, INR 10, INR 15, INR 20, and so on, linked to the number of stages of commute.

• **Create small value passes**: Agencies can create small value passes that bundle trips, valid for a certain period of time. However, agencies should maintain accurate boarding and alighting data in order to enable bus occupancy monitoring.

• **Invest in digital ticketing**: Transit agencies can also develop a mechanism to issue tickets via mobile applications (either their own or through other online ticketing platforms). Agencies can also work with telecom companies to develop SMS-based ticketing systems for non-smartphone users. The use of digital ticketing is advantageous as it can help track and trace passengers, in case an infection is detected.

• **Utilize transit cards**: Agencies can also use open, closed, or semi-closed loop cards to collect fares. For cities with existing metro networks, agencies can explore using metro cards for purchasing bus tickets. Care must be taken to record both the origin and
destination of all tickets procured using transit cards, to maintain a record of commuter movement in the city.

- **Use a cash box:** For commuters who are unable to procure passes, use closed-loop cards, or buy tickets online, the agency must provide physical fare collection boxes where commuters can drop cash with minimal contact with the conductor. This will also minimize cash handling by conductors and ensure their safety as well.

![Image](image_url)

*Figure 5: Bus operators should keep windows open to improve air circulation during a trip.*
*Image Credit: Kowloon Motor Bus*

**f. Prioritize the operation of non-AC buses:****

Considering that the virus is more likely to spread in closed air-conditioned spaces, transit agencies should prioritize the operation of only non-AC buses even after the immediate response period of the pandemic. Agencies should consider retrofitting AC buses with windows or rooftop ventilators that remain open during the duration of the trip to allow for circulation. Agencies must also ensure weekly disinfection of AC vents and frequent replacement of AC filters.

**g. Provide passengers detailed information on bus operations:**

Information regarding bus services, pickup, and drop-off points and schedules, along with real-time information regarding operations and occupancy, should be shared with commuters through passenger information systems at bus stops, mobile applications, or the transit agency website to prevent unnecessary crowding and/or to wait at bus stops and terminals. Additionally, information can be disseminated through information bulletins on local newspapers and posters at bus stops, terminals, and within the bus.

- **Share digital data:** Updated GTFS feed can be shared for use by third-party developers to keep passengers informed on changes to service.
• **Use passenger information systems:** Real-time information, wherever available, should be shared using LCD screens and other passenger information systems at bus terminals.

• **Use local media channels:** Updated routes and schedule information can be displayed at all operational bus stops and on-board buses. The information should also be broadcast through media channels--newspapers and TV.

**h. Upgrade infrastructure at public transit hubs:**

Boarding and alighting at ground level will reduce the need for commuters to touch handlebars or railings while entering and exiting the bus. However, this can be explored only for major stops. Ramp facilities (carried on the bus or stationed at the bus stop/terminal) can be made available to facilitate boarding and alighting.

i. **Minimize exposure time of on-board crew:**

This can be done through more frequent staff rotations, shorter working shifts, and alternate days off, as workforce availability permits.
4. Sanitizing buses, bus stops, and waiting areas

Routine cleaning and disinfection practices of public transport vehicles can play a role in minimizing the spread of diseases transmitted through contact with an infected person or surface. As such, transit agencies, in addition to the routine cleaning, should adopt the following measures:

**a. Clean buses frequently**:14

Buses should be cleaned and sterilized after each trip15. To increase the frequency of cleaning, transit agencies can organize rapid response cleaners stationed at terminal bus stops16. The cleaning frequency of the bus may be brought down to three times per day. Compressed air and/or water under pressure should not be used for cleaning as it might re-aerosolize infectious material. Vacuum cleaners should be used after disinfection has taken place.

![Figure 6: Bus operators should clean and sterilize buses after each trip](Image Credit: Gurugram Metro Authority)

**b. Focus on sanitizing high contact surfaces**:16

- **Surfaces with human interaction**: All bus surfaces with human interaction (passenger section and driver’s cabin) should be cleaned with detergent and water and then disinfected at regular intervals – during layovers, and intermittent rest stops. As cash and ticketing machines come in contact with passengers, on-board crew, and depot staff, they must be handled with gloves on and should be appropriately disinfected before handling.
• **Double down on high-touch areas:** Special attention should be paid to clean the following surfaces: armrests, seats and backrests, adjacent walls and windows, straps, handles, rails, and other fittings frequently used.

• **Use covers or seals:** In case these surfaces are difficult to clean or are liable to retain infectious residue, they should be sealed and covered with plastic or any material that can be intermittently changed.

c. **Maintain air circulation during operations:**

Good ventilation should be maintained in all operating vehicles, and as such, bus windows should always be kept open. Operators should retrofit AC buses with window vents to increase natural ventilation in the vehicle.

d. **Supervise cleaning activities**:  

All cleaning activities should be supervised and inspected periodically to ensure that correct procedures are followed. Records of all cleaning activities must be maintained and checked by drivers before starting consecutive trips.
5. Protecting and training depot and maintenance staff

While these measures remain similar to the immediate emergency response, they need to be continued at the same level of operation to avoid the spread of the disease between passengers and among the transit staff.

a. Precautions for depot and maintenance staff:

There are no specific occupational health and safety (OSHA) standards covering COVID-19. However, some OSHA requirements may apply to prevent occupational exposure to COVID-19.

- **Provide PPE for cleaning and handling trash**. The safety of maintenance staff is important, as they fall under the low-to-moderate risk category due to direct or indirect exposure to contaminated surfaces. The choice of disinfectant should be based on the guidelines issued by health officials. Additionally, they may have to handle harsh, volatile, alcohol-based chemicals during the cleaning process. PPE for cleaning and maintenance crew includes:
  - Non-sterile disposable gloves
  - Masks
  - Protective eye gear
  - Gowns

- **Remove and dispose of used protective gear safely**: PPE, such as gloves and masks, should be removed and disposed of safely to avoid contact with any contaminants that staff encounter.

Figure 7: Transit staff should use PPEs for all activities and must be regularly checked for symptoms of COVID-19

Image Credit: Metropolitan Transit System, San Diego, USA
• **Practice hand hygiene**: Staff must wash hands with soap immediately after disinfecting any surface and disposing of PPE.

• **Social distance of maintenance staff**: Staff must maintain a minimum distance of 3 feet between coworkers while working on the maintenance of the vehicle or otherwise, to avoid potential cross-contamination.

• **Disposal of cleaning materials properly**: All soiled material and gloves used for cleaning should be disposed of in a leak-proof bag that cannot be reopened. The disposal of these should be as per the city waste disposal guidelines.

• **Provide hand wash infrastructure**: All depots and service stations should be equipped with washbasins and toilets that are cleaned after every shift. Units should also be provided with disposable towels.21

• **Provide cleaning and sanitization liquid dispensers**: All service stations should be provided with liquid hand wash and alcohol-based sanitizer dispensers.

• **Institute periodic health check for all staff**: Transit agencies should conduct periodic health checks for all staff working during the pandemic response phase. Agencies should consider stationing thermal scanners at bus depots and have working staff undertake daily temperature checks.

b. **Staff training and communication:**22

• **Train staff in**:
  
  o *Using PPEs*: The transit agency must provide training for all maintenance staff on the use and disposal of PPEs to avoid cross-contamination.

  o *Handling ETM machines and cash boxes*: Staff must be trained on how to handle ETM machines and fare collection boxes, and how to disinfect them before distribution and after collection.

• **Provide communication material on hygiene practices**: Agencies must display posters at workstations on how to maintain personal hygiene, use PPEs, and clean hands, and other body surfaces that come in contact with potentially contaminated surfaces.

• **Ensure access to medical consultation**: Provide on-board crews and other transit staff with priority access to in-person or video-based medical consultation, in case of any symptoms. The crew should be offered psychological counseling if required, as they face a high risk of exposure, which increases the risk level of their jobs. Staff should also be provided with immunity-boosting supplements. Transit agencies should also work closely with the national and state-level health departments to stay aware of any advancements and provide priority access to vaccination when a COVID-19 vaccine is developed.

• **Implement a process for PPE inventory management**: As PPEs will be used by all staff daily, it is important to record and maintain a constant supply of these while
ensuring safe handling and storage. A process should be put in place to track and maintain available quantities of stocks of PPE and disinfectants. Transit agencies should also explore the possibility of leveraging support from private enterprises through measures such as the provision of PPEs for transit staff and commuters and the provision of dedicated private services to support the transit agency in coordinating emergency response activities.
Endnotes


