

Training on

# Response & Preparedness during COVID-19 Times

on Risk Communications and Infection Prevention,  
Control on Environmental Sanitation and Waste Management  
in Cities of Maharashtra

**Resource book**



All India Institute of Local Self-Government, Mumbai with  
United Nations Children's Fund, Mumbai  
Maharashtra Pollution Control Board

in collaboration with

Urban Development Department, Government of Maharashtra



## **Title**

Resource book on 'Response and Preparedness during COVID-19 Times on Risk Communications and Infection Prevention, Control on Environmental Sanitation and Waste Management in Cities of Maharashtra'.

## **Date of Publication**

June 2020

## **Content**

This material is developed as 'Training of Trainers' module for web-based trainings prepared by All India Institute of Local Self Government, Mumbai and United Nations Children's Fund, Mumbai.

## **Disclaimer**

While every effort has been made to ensure the correctness of data/information used in this training module, the authors do not accept any legal liability for the accuracy or inferences drawn from the material contained therein or for any consequences arising from the use of this material.

## **Address:**

### **All India Institute of Local Self Government, Mumbai**

Plot No.6, F-Block, T.P.S. Road-12  
Behind Teacher Colony  
Bandra-East Mumbai  
400 051

### **United Nations Children's Fund, Mumbai**

215 Atrium, Andheri - Kurla Road  
Hanuman Nagar  
Andheri East, Mumbai, Maharashtra  
400059

# Content

---

**09.**

**01. Introduction**

**14.**

**02. Public Health Aspects of COVID-19**

**32.**

**03. Water Sanitation and Hygiene - Precautions,  
Preventive Measures and Good Practices**

**61.**

**04. Biomedical Waste Management**

**78.**

**05. Conclusion and Way Forward**





## Key message



The outburst of the COVID-19 has put the world in a public health crisis. The State Government under the able leadership of Honorable Chief Minister of Maharashtra Shri. Uddhavji Thackeray has taken numerous dedicated measures to combat this unprecedented situation.

Under Swachh Bharat Mission, launched by the Ministry of Housing and Urban Affairs, Government of India, the State Government and Urban Local Bodies across Maharashtra have undertaken multiple initiatives which have been crucial for managing the pandemic. ULBs have created COVID healthcare facilities including care centers & isolation wards, supplying PPE & medical equipment, facilitating safe disposal of biomedical waste, categorization of zones and testing of suspected COVID cases.

Smart Cities have been effectively dealing with the ongoing pandemic aided by various IT tools such as MIS, Dashboards, GIS Mapping, AI and data analytics to monitor COVID-19 cases, extrapolate trends/patterns, create modular medical facilities, access nursing staff / doctor availability, arrange supplies, monitor outbreak hotspots etc. to ensure the situation is critically managed. Some of these initiatives like Command Control Room, Hospital MIS, Central sanitation & waste management dashboard have been replicated in few other ULB's which has helped in mitigating challenges and ensure better preparedness towards future pandemic.

Moving forward, Health and safety will now remain one of the top priorities and for this, efficiency of urban public health system in cities is being strengthened and revamped. Technological interventions will be critical and instrumental in mapping the trend of this virus and enable quick response to developing situations. All the stakeholders involved in this crisis including the government, private sector and donor agencies are now rethinking on their strategies to revamp policies, approaches and ways of working for safe future in the new normal.

With the mammoth support from the citizens I am confident that Maharashtra will successfully overcome the COVID-19 crisis and be an inspiration to other States in India.

**Mahesh Pathak, IAS**  
**Principal Secretary,**  
**Urban Development Department,**  
**Government of Maharashtra**



In the backdrop of the ongoing COVID-19 pandemic, Hon'ble NGT (Principal Bench), Delhi in its order in the matter OA 72/2020, dated 24<sup>th</sup> April 2020 underlined need for scientific management and handling of COVID-19 waste strictly in accordance with BMW Rules, 2016 and the CPCB guidelines. The order noted that "there is need for orientation/training of persons responsible for compliance in Local Bodies and Health department by an online mechanism".

MPCB, UNICEF and AILSG Mumbai, in collaboration with UDD, Govt. of Maharashtra, organised an online training programme in 4 batches on the 19-22nd May 2020 on "Response & Preparedness during COVID-19 Times on Risk Communications and Infection Prevention, Control on Environmental Sanitation and Waste Management for ULBs in Maharashtra" to train the trainers at Municipal Corporations and Councils in Maharashtra.

The programme included modules/sessions on A) Public Health Aspects of COVID-19 B) Precautions and Preventative Measures and Good Practices for WASH and C) Biomedical Waste Management with special reference to COVID-19 BMW.

Experienced resource persons from the World Health Organisation (WHO), MCGM, CPCB Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi, National Institute of Public Health Training & Research (NIPHTR), Tata Trust, National Environmental Engineering Research Institute (NEERI), in addition to the MPCB, UNICEF, and AILSG, Mumbai contributed to actual training.

In view of the demand from various stakeholders, it is decided to disseminate the training material and other resource reference, for enabling further roll out of trainings to the frontline health and sanitation workers. Once restriction under the lockdown are relaxed, we propose on-site training for the Public Health officers, Para Medical staff in Government and Private Hospitals, House Keeping and Sanitation Workers, Asha Workers, and common Biomedical Waste treatment facilities who handle biomedical waste, on waste handling and biomedical waste management.

I sincerely appreciate the support extended by the Urban Development Department and Environment Department, Government of Maharashtra. I thank the Directorate of Maharashtra Urban Development Missions (MUDM) for making the ToT possible in a short time and I further congratulate the sincere efforts made by the team of AILSG Mumbai, UNICEF Mumbai and MPCB in developing the ToT Module and conducting the training programmes successfully.

**E. Ravendiran, IAS**  
**Member Secretary,**  
**Maharashtra Pollution Control Board**



The ongoing COVID-19 pandemic and the escalation of cases have put the world in multi- sectorial crisis. The crisis is expected to have a social as well as economic impact. Such a drastic situation calls for the World to fight together against the invisible enemy. UNICEF at a global level has been working on various sectors like public health, WASH, health emergencies etc. and continues to work and support the government's initiatives to tackle the crisis.

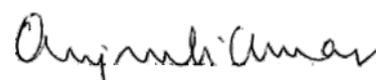
UNICEF, India is pleased to assist Government of India (GoI) by supporting several states and local bodies in COVID-19 management by channelling their existing multi-sectorial teams comprising of experts in health, water and sanitation, disaster risk reduction etc. UNICEF also brings national and international experience to assist GoI in reducing the impact of COVID-19.

UNICEF Mumbai continues to support Government of Maharashtra during the pandemic times. As per Hon'ble NGT's order dated 24<sup>th</sup> April 2020, need for conducting training for municipal officials was established. In response to this, Maharashtra Pollution Control Board, UNICEF Mumbai and All India Institute of Local Self Government, Mumbai in collaboration with Urban Development Department, Government of Maharashtra organised web based training programmes for all the urban local bodies in Maharashtra on 'Response and Preparedness during COVID-19 times on risk communications and infection prevention, control on environmental sanitation and waste management in cities of Maharashtra'. The objective of these training programmes was to share the updated knowledge and create a platform for discussing solutions to the field level challenges faced by the municipal officials and frontline workers; in public health, water-sanitation, municipal solid waste management and bio-medical waste management, while tackling the pandemic.

This resource book has been prepared in continuation to these web based training programmes with an objective of further dissemination of this vital information on response and preparedness during COVID-19 times, within other cities and states.

I would like to appreciate the support extended by UDD, GoM to this timely initiative. I also take this opportunity to thank the panel of resource persons and field experts from World Health Organisation, Central Pollution Control Board, National Institute of Public Health Training & Research-MoHFW, National Environmental Engineering Research Institute, Municipal Corporation of Greater Mumbai and Tata Trust, for their valuable contribution and inputs which have helped in making the training programmes successful.

Lastly, I thank and congratulate the team of MPCB, UNICEF Mumbai and AILSG Mumbai for their sincere efforts and the great partnership in making this initiative a success.

A handwritten signature in black ink, appearing to read "Rajeshwari Chandrasekar".

**Rajeshwari Chandrasekar,  
Chief of Field Office,  
UNICEF Maharashtra**



**RCUES**  
Mumbai  
and Centre for  
Sustainable Governance

## Foreword



Across the globe, COVID-19 is intimidating cities and societies posing a grave danger to public health. This has impacted communities from all strata of the society. This situation is already having a multi-dimensional impact on the functioning of urban local bodies and their coping mechanisms. In large cities, residents of informal settlements and slum are more vulnerable as these areas lack access to infrastructure and basic services including water, sanitation, waste management and access to affordable health care facilities.

During such times, updating the ULB officials and relevant decision makers who are involved in the provision of these services with adequate information is crucial which will help them in taking appropriate decisions in addressing the immediate challenge. All India Institute of Local Self Government has been involved in providing capacity building and technical support to the State and local governments through its more than 30 centers all over India. AIILSG has been conducting Sanitary Inspectors' courses for the candidates aspiring to join health and sanitation departments, many of whom are now sanitation taskforce in urban local bodies all over the country.

Given this extensive experience, AIILSG Mumbai with United Nations Children's Fund UNICEF and Maharashtra Pollution Control Board MPCB, in collaboration with Urban Development Department UDD, Government of Maharashtra GoM have developed this resource book on 'Response and Preparedness during COVID-19 Times on Risk Communications and Infection Prevention, Control on Environmental Sanitation and Waste Management in Cities of Maharashtra'. Based on the 'training of trainers' module of this resource book, web-based trainings were conducted for all the urban local bodies in Maharashtra in the month of May 2020, witnessing more than 1200 participants with overwhelming positive feedback.

Based on these trainings, I am pleased to announce this resource book which can be a guiding document for ULBs to deal with the perplexing circumstances of COVID-19. I hope that this resource book helps in disseminating valuable information related to environmental sanitation and waste management and benefit the officials in responding effectively to these challenging times.

I congratulate the team of MPCB, UNICEF field office of Mumbai and RCUES & CSG at AIILSG Mumbai for this most required timely initiative, supported by the UDD, GoM and further extend our sincere thanks to the resource organisations for supporting this initiative, including World Health Organisation, Central Pollution Control Board, National Institute of Public Health Training & Research- MoHFW, National Environmental Engineering Research Institute, Municipal Corporation of Greater Mumbai and Tata Trust.

**Rajiv Agarwal, IAS (Retd.)**

**Director General**

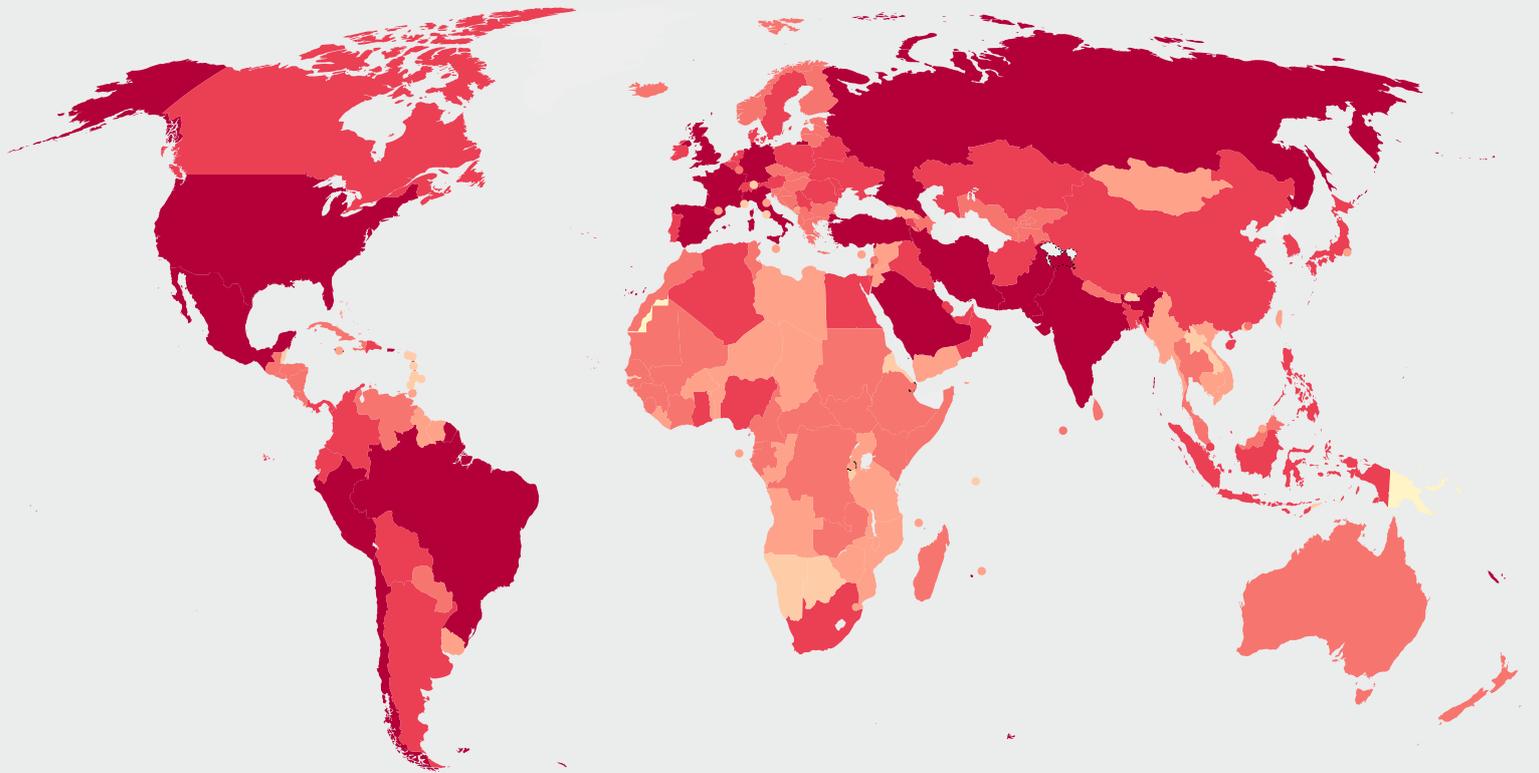
**All India Institute of Local Self Government**



# Introduction



1-9 10-99 100-999 1,000-9,999 10,000-99,999 100,000 or more



Dated as on June 2020

Source: bloomberg.org

---

## Introduction

---

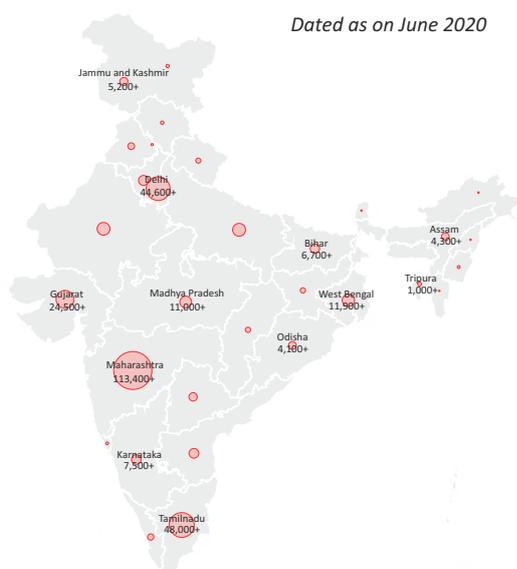
In January 2020, the World Health Organization (WHO) declared that the outbreak of a novel coronavirus in China constituted a public health emergency of international concern. After a sudden surge in cases since then, WHO has recognized it as a pandemic affecting more than 115 countries around the world. Despite containment efforts, the rapid outbreak of Corona Virus Disease (COVID-19) has caused an alarming health crisis that leaders around the world are struggling with. The situation is no different in India and thousands of city officials and on-field staff are working at battling the virus, putting their own lives at risk. National, state and local governments are working together to understand and address the challenges posed by this situation. Government of India (GoI) with its various ministries, including Ministry of Housing and Urban Affairs (MoHUA) and Ministry of Health and Family Welfare (MoHFW) are leading the way for state governments and Urban Local Bodies (ULBs) to tackle the obstacles arising out this pandemic in cities.

The provision of safe water supply, sanitation and waste management services is essential to protect human health during all infectious disease outbreaks, including the COVID-19 outbreak. Ensuring evidence-based and consistently applied WASH and waste management practices in communities,



Source: India Today

homes, schools, marketplaces, and health-care facilities will help prevent human-to-human transmission of the virus that causes COVID-19. (WHO, April 2020) Thus, it is crucial that the officials and workers of ULBs who are involved in provision of these services be acquainted with appropriate measures for self-precautions and infection prevention and control, while dealing with response to COVID-19. Improvement in knowledge of such stakeholders will assist them in taking appropriate decisions in effectively addressing the immediate challenge. Once this is done, these officials can further disseminate this information to their Front Line Workers (FLW).



COVID-19 positive cases in India Source: nytimes.com

In the backdrop of the ongoing COVID-19 pandemic, Hon'ble National Green Tribunal (NGT) in their order dated 24<sup>th</sup> April 2020 has noted that while the Central Pollution Control Board (CPCB) has issued updated guidelines on biomedical waste management in the specific context of COVID-19, gaps continue to exist in compliance of BMW Rules in terms of capacity to scientifically dispose of generated waste and non-compliance of procedural and monitoring aspects. The judgment noted that 'there is need for orientation/training of persons responsible for compliance in Local Bodies and Health departments by an online mechanism'.



### Dissemination of knowledge

Based on this context, All India Institute of Local Self Government (AIILSG) Mumbai, Maharashtra Pollution Control Board (MPCB) and United Nations Children's Fund (UNICEF) Mumbai have jointly developed this module of web-based Trainings of Trainers (ToT) on 'Response and Preparedness during COVID-19 Times on Risk Communications and Infection Prevention, Control on Environmental Sanitation and Waste Management for ULBs in Maharashtra'. These trainings were a result of response to mandate to MPCB from Hon'ble NGT to conduct trainings for ULBs, UNICEF as key working organization in response to COVID-19 in the state, AIILSG Mumbai with its extensive background of capacity building and demand from ULBs themselves for such trainings.

## About the module



The module is intended as web-based ToT for ULBs and health care facilities operators to help them identify the risks and hazards involved in management of services in these times and provide guidance through various subject experts.

## Target group

The module is targeted for a mixed group of policy makers/ administrators and executors/ service providers of ULBs involved in sanitation and waste management of COVID-19, who can further disseminate the information to their front line workers. These include:

- Commissioners, Chief officers and Engineers.
- Sanitary Inspectors and operators of public toilets, STPs, FSTPs & ETPs.
- MSW collectors, transporters and disposal site managers/ operators.
- Health care facilities operators.

## Objectives of the training

- Imparting latest knowledge and practical ground level solutions in COVID-19.
- Risk communications and community engagement under environmental sanitation, waste management and public health.
- Precautions and preventive measures under waste management and disinfection process.
- Understanding challenges of FLW and service providers engaged in sanitation and waste management at slums, densely populated areas and containment zones.
- Regulatory, ethical and mandatory reporting requirements.
- Understanding on safety gear for FLW and service providers.
- Available technologies/ DO's and DON'Ts/ good practices.

## Development of the module

The module is developed with combined efforts and support from multiple organizations involved in dealing with COVID-19 in environmental sanitation, waste management and public health. These include WHO, MoHUA, MoHFW, CPCB, National Institute of Public Health Training & Research (NIPHTR), National Environmental Engineering Research Institute (NEERI), Municipal Corporation of Greater Mumbai (MCGM) and Tata Trust. Extensive experience of a panel of experts and resource persons from these organizations in the sector helped in adding value to the training and made it effective and beneficial to the target audience.

## Format of the module

The module contains all the sessions to be covered while conducting the training. Each session is divided in two parts:

- Notes/description of the session.
- Session slides.

## Duration of the module

🕒 **Total time of the training: 120 minutes**

SN	Activity	Format	Time (Minutes)
1	Pre-preparation/ setup on portal		10
2	Introduction to training	Presentation by the moderator	3-4
3	Training – Discussion on all sessions	Presentations by experts/ trainers	70
i	Public Health Aspects of COVID-19		20
ii	WASH Precautions and Preventive Measures		20
iii	Biomedical Waste Management		20
iv	Video on 'Safe Management Practices in COVID -19' by UNIDO		10
5	Strategy for roll out to next level		5
6	Post training assessment		5
7	Question and Answers	Doubts/ discussions by participants	25
8	Conclusion	Wrap up by the moderator	1



**Public  
Health  
Aspects of  
COVID-19**



---

# Session 1: Public Health Aspects of COVID-19

 Duration: 20 minutes

---



*Image source: Thrive global*

## Need of the session

The WHO states COVID-19 as an infectious disease caused by a newly discovered coronavirus. Since the coronavirus is highly transmissible, precautions has to be taken at individual as well as at community level to contain the spread of the virus. It is essential to understand the common symptoms of COVID-19, routes of transmission, and precautions to be taken in order to tackle it. Since the world is facing a never seen before issue there are high probabilities of stigma being associated with it which makes it even more difficult to contain the virus. To avoid spreading of the virus it is crucial that the right information is disseminated to the citizens. Hence this session addresses these factors related to COVID-19.

## Key points covered

The session aims to cover the following:

- Common symptoms of Covid-19 pandemic and its pattern of progression.
- Facts on COVID-19, it's routes of infection, modes of transfer, meaning of containment zone and home quarantine and how to practice it.
- Norms for physical distancing, coughing etiquettes and hand washing practices.
- Categories of COVID-19 cases (Mild, moderate and severe) and different arrangements for them.
- Methods to address stigma and rumors attached to the pandemic.
- Psychosocial health care of FLW and initiatives taken by government authorities to assist FLW to tackle them.
- Agencies involved in COVID-19 pandemic prevention and control - global, national and local level.

## Reference notes

COVID-19 is a highly contagious virus, caused by Severe Acute Respiratory Syndrome (SARS). Common symptoms of COVID-19 are fever, cough, and difficulty in breathing. The virus is not airborne but is spread through the infected droplets landing on surfaces. Since the virus is transferred through contact, it spreads rapidly. The report on 'WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19)' maps the pattern of progression of the disease. The report suggests that to reduce mortality rate of the disease it is essential that immediate testing and treatment is provided to the COVID-19 patients.

### **Modes of transmission**

To contain the spreading of COVID-19 it is crucial to understand the modes of transmission of the virus. MoHUA has published infographics which depict the nine common means of spread of the virus. Type of contacts for the spread of the virus can be divided in two categories i.e. high risk contact and low risk contact. A person is at a high risk when he/she has been in direct exposure to any confirmed or asymptomatic patient of COVID-19. Individual who has touched body fluids, touched or cleaned linens, lives in the same house as the patient or is in close proximity to confirmed cases of COVID-19 without precautions is at a high risk. A person is at low risk contact, if he/she has shared the same space with a COVID-19 positive patient but has not had a high-risk exposure mentioned above.

### **Measures to be taken to reduce transmission of COVID-19**

To reduce transmission of COVID-19, restrictions on the movement have to take place at individual as well as at community level. For individual movement restrictions, persons who are believed to be exposed to the infection have to quarantine i.e. separation and restriction of movement from the community for 14 days from the date of exposure. During the quarantine period, COVID-19 suspects have to stay in well ventilated specific room, keep distance with other people in the house, avoid visitors in the house, seek immediate health care, notify the authorities accordingly, avoid going to public areas and wear masks when they are around other people. Strict community movement restrictions are formulated for specific areas known as 'containment zones' to prevent further spread of the virus.

According to the MoHFW, GoI, a containment zone refers to a specific geographical area where positive cases of COVID-19 are found. The boundary of the containment zone shall be defined by district administrations as per MoHFW guidelines. Containment zones shall be demarcated with red (hotspots) and orange zones by States/ UTs and district administrations based on the guidelines of MoHFW. Districts shall be defined as Red Zones or Hotspot districts by MoHFW, GoI, taking into account total number of active cases, doubling rate of confirmed cases, extent of testing and surveillance feedback. Districts with zero confirmed cases till date or districts with no confirmed case in the last 21 days are demarcated as green zones, whereas, districts which are neither demarcated as red or green are demarcated as orange zones. Individuals living in the containment zone are at a higher risk for getting infected by the COVID-19 virus. Hence, it is essential that they follow hygiene practices like wearing a mask, hand washing, change and washing of clothes after coming home from outside and other measures prescribed as precautions against COVID-19.

### **Hand and respiratory hygiene measures to be followed**

MoHFW, GoI has published guidelines for hygiene measures to be undertaken to contain further spreading of the virus. Respiratory hygiene measures are a combination of measures taken to stop the spread of germs through respiratory behaviors like coughing or sneezing. MoHFW guidelines illustrates do's and don't's for appropriate respiratory hygiene. Use of mask and hand hygiene are crucial to contain spreading of the virus. Using a mask incorrectly may hamper its effectiveness to reduce the risk of transmission. It is essential that masks are worn properly and adequate precautions are taken while

wearing and removing it. Similarly, appropriate procedure must be followed while washing hands. Suitable procedure for use of masks and hand hygiene are illustrated by MoHFW, GoI published in 'COVID-19: Response and Containment Measures'.

FLW have to take additional hygiene measures when they reach home to ensure the virus does not reach their home. Before reaching home, the workers should ensure that the door is left open for them to enter. If not, the door has to be sanitized after opening. FLW have to remove their shoes outside the house and sanitize their hands and belongings. The clothes and mask worn by them have to be washed and the worker has to take a bath immediately. Since these workers are at risk from working outdoors in the pandemic situation, these crucial measures have to be followed by them to safeguard themselves and their families from the virus.

### **Stigma attached to COVID-19 and measures to be taken to tackle it**

COVID-19 is a novel virus about which many new things are still being discovered. The uncertainty of dealing with something unknown may lead to fear among people which may be escalated by rumors, fake news or incorrect information. This has led to a certain level of stigma being attached to COVID-19. This may refrain the people from timely approaching health services or adopting healthy behaviors. Hence it is essential to address this stigma for which FLW can play a crucial role. These workers can sensitize people by helping them understand the severity of the virus. They can advise people to engage in relaxing activities and to stay away from rumours and fake news. Community influencers can be engaged so that correct information on COVID-19 is shared with people. FLW have to be sensitive about the terminologies they use in front of the people so as to avoid any negative implications of it. The FLW who are performing their duties in such severe times deal with tremendous psychological and social pressure. Special efforts have to be made to reach out to the senior citizens and younger children.

### **Psychosocial health care of service providers**

The world is facing a never seen before situation and ULBs are working to make sure services are seamlessly provided to the citizens. The FLW who are performing their duties in such severe times deal with tremendous psychological and social pressure. To help the FLW in dealing with stress MoHFW has launched a toll free helpline. Stress Management Training modules are available on the website of MoHFW, GoI. Government of Maharashtra also launched a toll free helpline for mental health known as SAMVAAD. This assistance has been laid out by the government institutes for psychological wellbeing of service providers as well as citizens.

Toll free helpline for healthcare workers facing stress launched by MoHFW: 8046110007

Toll free mental health helpline for citizens launched by GoM: 1800-102-4040

Reference link for stress management training module by MoHFW:

<https://www.mohfw.gov.in/index.html>

# Training content

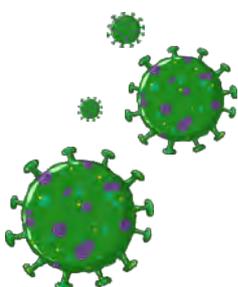
## 1.1. Global Scenario

The following section gives a brief understanding about COVID-19 and global situation of the pandemic.

### What is COVID-19?

Commonly referred to as Coronavirus, COVID-19 is Coronavirus Disease 2019

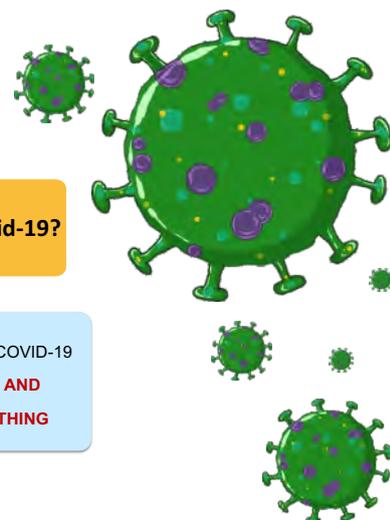
- Caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)
- Commonly presents with flu like symptoms
- Is highly contagious



#### What are Common Symptoms of Covid-19?



THE SYMPTOMS OF COVID-19  
ARE **FEVER, COUGH, AND  
DIFFICULTY IN BREATHING**



Source: MoHFW, GoI: [https://www.mohfw.gov.in/pdf/2COVID19PPT\\_25MarchPPTWithAnimation.pdf](https://www.mohfw.gov.in/pdf/2COVID19PPT_25MarchPPTWithAnimation.pdf)

The etiologic agent responsible for present outbreak of COVID-19 is SARS-CoV-2 which is a novel coronavirus. Transmission of coronaviruses can occur via respiratory secretions. Most common symptoms include fever, fatigue, dry cough and breathing difficulty. Upper respiratory tract symptoms like sore throat, rhinorrhea and gastrointestinal symptoms like diarrhea and nausea/ vomiting are seen in about 20% of cases. COVID-19 is a highly contagious disease.

**Reference link:** [https://www.mohfw.gov.in/pdf/2COVID19PPT\\_25MarchPPTWithAnimation.pdf](https://www.mohfw.gov.in/pdf/2COVID19PPT_25MarchPPTWithAnimation.pdf)

## Global Situation

---

**First widely reported in Wuhan Province of China, Covid-19 has rapidly spread across the world**

- Globally **79,41,791** confirmed cases and **4,34,796** confirmed deaths as on 17<sup>th</sup> June 2020<sup>1</sup>
- India has **3,54,000** confirmed cases and **11,903** confirmed deaths as on 17<sup>th</sup> June 2020<sup>2</sup>
- **Maharashtra has** (As on 17th June 2020)  
**1,10,744 confirmed cases and**  
**4,127 confirmed deaths**
- Area under the Municipal Corporation of Greater Mumbai (MCGM) reported **60,228** confirmed cases and **3,167** confirmed deaths as on 14th May 2020<sup>3</sup>

1: Source: WHO: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>

2: Source: MoHFW, GoI: <https://www.mohfw.gov.in/#>

3: Source: PHD, GoM: <https://arogya.maharashtra.gov.in/1175/Novel--Corona-Virus>

First widely reported in Wuhan Province of China, Covid-19 has rapidly spread across the world. Globally 79,41,791 confirmed cases and 4,34,796 confirmed deaths as on 17<sup>th</sup> June 2020. India has 3,54,000 confirmed cases and 11,903 confirmed deaths and Maharashtra has reported 1,10,744 confirmed cases and 4,127 deaths as on 17<sup>th</sup> June 2020. During same period, 60,228 cases and 3,167 deaths are reported from Mumbai.

### Reference links:

1. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>
2. <https://www.mohfw.gov.in/#>
3. <https://arogya.maharashtra.gov.in/1175/Novel--Corona-Virus>

## 1.2. Disease Epidemiology

---

The following section analyses the patterns of the virus and the possible modes of transmission.

## Coronavirus - Transmissibility

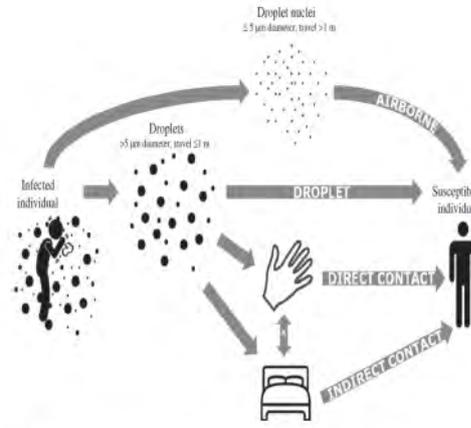
- **Infected droplets**
  - >5µm, travel <1m
- **Aerosols**
  - <5µm, travel >1m
- **Contact**
  - **Hands, surfaces**

### Survivability outside body:

- 1-2 days on nonporous surfaces
- 8-12 hours on porous surfaces
- Currently this information on 2019-nCoV not clear

### Incubation period:

Current estimates of the incubation period of SARS-CoV-2 range from **2-14 days**.



\* Transmission routes involving a combination of hand & surface = indirect contact.

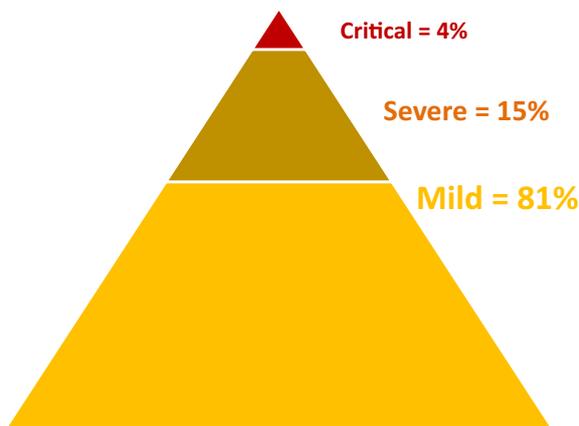
Figure 1. Transmission routes: droplet, airborne, direct contact, and indirect contact. (Indirect contact: routes involving a combination of hand and surface.) Definitions of 'droplet' and 'droplet nuclei' are from Atkinson et al.<sup>3</sup>

Source: Presentation on COVID-19 by Dr Vivek R Pardeshi, Surveillance Medical Officer, WHO India

As novel coronavirus is a droplet infection, it spreads via/ through infected droplets. Infected droplets >5µm travel <1m and aerosols <5µm travel >1m and infect surrounding surfaces, The virus gets transmitted to a person if he/she comes in contact with the virus droplets. Current estimates of the incubation period of COVID-19 ranges from 2-14 days. This is the basis of social distancing, coughing and sneezing etiquettes, hand hygiene and isolation/quarantine for 14 days.

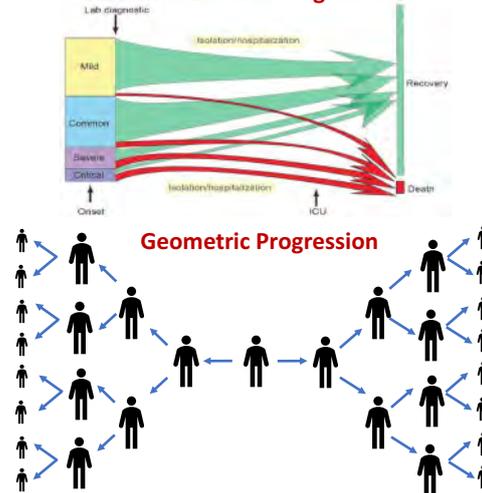
## Disease Severity and Progression

### Epidemiology – severity of illness (n=72,314)



Source: China CDC Weekly Vol2 (8)

### Pattern of Disease Progression



Source: Report of WHO China Joint Mission, February 2020

Early diagnosis and treatment is the key to successful recovery for COVID-19 patients. Mortality can be reduced by prompt contact tracing, testing and timely management.

### Reference links:

1. <http://weekly.chinacdc.cn/fileCCDCW/journal/img/cover/d5e835cf-709b-4bf0-92ec-40e053c24960.pdf>
2. [https://www.who.int/publications/i/item/report-of-the-who-china-joint-mission-on-coronavirus-disease-2019-\(covid-19\)](https://www.who.int/publications/i/item/report-of-the-who-china-joint-mission-on-coronavirus-disease-2019-(covid-19))

## Modes of Transmission



Modes of transmission are as mentioned in the diagram above. The droplets from the sneeze/cough of infected person are transferred to surfaces. The virus gets transferred when someone touches the surfaces where the infected droplets have landed. Thus, the primary mode of transfer of infection is through contact.

*Reference link:* [https://www.mohfw.gov.in/pdf/2COVID19PPT\\_25MarchPPTWithAnimation.pdf](https://www.mohfw.gov.in/pdf/2COVID19PPT_25MarchPPTWithAnimation.pdf)

### 1.3. Prevention and Control - Quarantine & Containment Zones

The following section illustrates methods to be followed at individual as well as community level through which the spread of the virus can be controlled.

## Types of Contacts

### High Risk Contact

1. **Touched body fluids** of the patient (Respiratory tract secretions, blood, vomit, saliva, urine, faeces)
2. Had **direct physical contact** with the body of the patient including physical examination without PPE
3. **Touched or cleaned** the linens, clothes, or dishes of the patient
4. Lives in the **same household** as the patient
5. Anyone in **close proximity** (within 3 ft) of the confirmed case **without precautions**
6. Passenger in **close proximity** (within 3 ft) of a conveyance with a **symptomatic person** who later tested **positive** for COVID-19 for **more than 6 hours**

### Low Risk Contact

1. Shared the **same space** (Same class for school/worked in same room/similar and **not having** a high risk exposure to confirmed or suspect case of COVID-19)
2. Travelled in **same environment** (bus/train/flight/any mode of transit) but **not having** a high-risk exposure



Source: Presentation on COVID-19 by Dr Vivek R. Pardeshi, Surveillance Medical Officer, WHO India

### Types of contacts:

#### High risk:

A person is at high risk of getting infected by the virus when he/she has touched body fluids or surfaces touched or used by the patient. This may happen when a person is in close proximity (within 3 feet) of the patient i.e. living in the in the same household as a confirmed case or in close proximity of a confirmed case without precautions or if in close proximity with a passenger during conveyance. A person may also be at high risk if he/she is/was in close proximity for more than 6 hours with an symptomatic person who is later tested positive for COVID-19.

#### Low risk:

A person is at a low risk of getting infected by the virus when he/she has shared a common space (same class for school/worked in same room/similar shared spaces) and does not have a high risk exposure to a confirmed or suspect case of COVID-19. A person is at low risk also when he/she has traveled in a common environment (bus/train/flight/any mode of transit) but does not have a high-risk exposure.

#### Identification of Red (Hotspots), Green and Orange Zones:

Government has strategically categorized districts/urban areas in green and red zones for control of COVID-19. Areas with high prevalence of the disease are labelled as red zones with stringent restrictions to stop spread of the disease. Districts/urban areas with no cases at all or no cases for at least 21 days are categorized as green zones. Rest of the areas are considered orange zones.

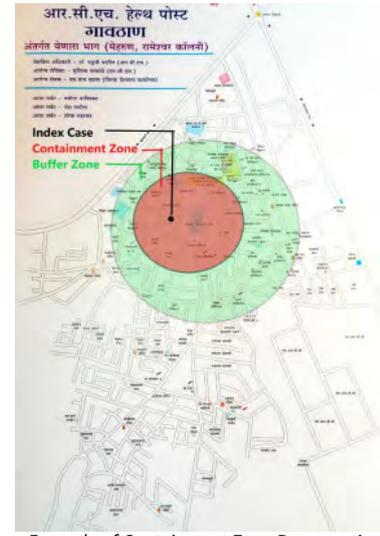
## Identification of Containment Zones

According to the Health Ministry, a containment zone refers to a **specific geographical area where positive cases of corona virus are found.**

Strict movement restrictions are put in place in such areas to prevent further spread of the virus

- Containment Zones shall be demarcated within Red (Hotspots) and Orange Zones by States/ UTs and District Administrations based on the **guidelines of MoHFW. BMC has also issued a guideline.**
- The boundary of the Containment Zone shall be defined by **District Administrations** taking into account the following factors: mapping of cases and contacts; geographical dispersion of cases and contacts; area with well demarcated perimeter; and enforceability
- The boundary of the Containment Zone will be a residential colony, mohalla, municipal ward, municipal zone, police station area, towns etc., in case of urban areas
- **There is a need to link ward level microplanning with Containment zone planning**

Source: Presentation on COVID-19 by Dr Vivek R Pardeshi, Surveillance Medical Officer, WHO India



Example of Containment Zone Demarcation

MoHFW, Gol has given containment zones guidelines for implementation of strict perimeter control of areas with multiple COVID-19 infected persons. Strict movement restrictions are put in place in such areas to prevent further spread of the virus. Perimeter control is primarily an administrative measure – Enhanced surveillance within the perimeter is a part of the larger administrative response in containment zones. Containment zones shall be demarcated within red (hotspots) and orange zones by States/ UTs and district administrations based on the guidelines of MoHFW. MCGM has also issued guidelines based on the same.

The boundary of a containment zone shall be defined by district administrations taking into account the following factors - mapping of cases and contacts, geographical dispersion of cases and contacts, area with well demarcated perimeter and enforce ability. The boundary of the containment zone may be a residential colony, mohalla, municipal ward, municipal zone, police station area, town etc. In case of urban areas there is a need to link ward level micro planning with containment zone planning.

Rapid Response Teams (RRTs) need to be oriented on the enhanced surveillance and contact tracing in containment zones. Daily surveillance on health status of persons is needed for early detection, laboratory testing and timely treatment of the detected cases.

## Quarantine – Community and Home

### What is Quarantine?

1. **Separation and restriction of movement** or activities of persons who are **not ill** but who are **believed to be exposed** to infection
2. Groups of persons who are **exposed** to large public gathering
3. Persons are usually quarantined in their **homes** but they are also quarantined in **community based** facilities
4. **Closing** of local or community **borders** with **strict enforcement** to **prohibit movement** into and out of area

### Why Quarantine?

1. Quarantine **reduces transmission** separating contacts of COVID-19 patients from community

### Precautions in Quarantine

1. **Monitoring** of contacts
2. **Segregation** of COVID-19 suspects **ASAP** from among other quarantined persons

Source: Inputs by Dr Sanjay Pattiwar, Former Health Officer, NMMC

**14**

Duration of quarantine for COVID-19 is **14 days** from the time of exposure



It is vital to quarantine and restrict movements of individuals who might have been in contact with COVID-19 patients so as to arrest spread of the disease. If separate toilet facility and physical distancing is manageable, persons in contact can be quarantined at home. If any person does not have such facilities they are quarantined at quarantine facilities which are managed by health workers and dedicated volunteers. If symptoms are detected, quarantined persons are treated as per government protocols. As incubation period of COVID-19 ranges from 2-14 days, quarantine for 14 days is essential.

## Home Quarantine

### RESTRICTED MOVEMENT FOR COVID-19 SUSPECTS

#### 1. KEEP DISTANCE

- Stay in a well ventilated specific room and away from other people in your home. Restrict movement
- If available, use a separate bathroom

#### 2. AVOID VISITORS IN THE HOUSE

- Because if infected, you can spread infection to others

#### 3. SEEK HEALTH CARE AND NOTIFY

- If suffering from cough or fever or breathing difficulty and suspecting contact, wear a mask, and notify nearest health facility / Asha/ANM
- Immediately.

#### 4. AVOID GOING TO PUBLIC AREAS

- Do not go to work, school, or public areas like markets, cinemas etc.
- Avoid using public transport

#### 5. WEAR A MASK

- Wear a mask correctly when you are around other people and whenever you enter a healthcare provider's clinic

Source: MoHFW, GoI: [https://www.mohfw.gov.in/pdf/2COVID19PPT\\_25MarchPPTWithAnimation.pdf](https://www.mohfw.gov.in/pdf/2COVID19PPT_25MarchPPTWithAnimation.pdf)

Those individuals who are home quarantined have greater responsibility as they are not under direct supervision of support team for 24 hours. Hence they must follow norms set by the government very strictly.

## 1.4. Physical Distancing, Respiratory Hygiene, Handwashing Practices

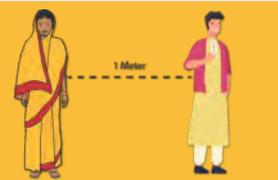
The following section explains the practices to be followed for physical distancing, respiratory hygiene and hand washing practices.

### Physical Distancing – Do's & Don'ts

Social distancing means deliberately increasing the physical space between people to avoid spreading illness. Staying **at least one meter away** from other people lessens your chances of catching Covid-19.

**DO**

- Stay at home unless absolutely necessary
- Keep a distance of at least one meter between yourself and another person



**DON'T**

- Do not hold events where people have to gather (even if it is a corner meeting with three or four friends, or an evening chat on the *chaupal*)
- Do not go to crowded places like markets, shopping, melas, parties
- Do not use public transport



Source: MoHFW, Gov: [https://www.mohfw.gov.in/pdf/2COVID19PPT\\_25MarchPPTWithAnimation.pdf](https://www.mohfw.gov.in/pdf/2COVID19PPT_25MarchPPTWithAnimation.pdf)

As droplets spread 3 feet around infected individual, it is important to maintain physical distancing. Events/festivals, gatherings/meetings and travel by public transport must be avoided. Public transport also must be avoided. Government guidelines on restricted number of individuals attending inevitable events like cremation, burial and functions like marriages must be strictly followed to help control spread of the virus.

## Respiratory Hygiene – Do's & Don'ts

Respiratory Hygiene is a combination of measures taken to stop the spread of germs through respiratory behaviours like coughing or sneezing

### DO

- **DO USE** a handkerchief or a tissue to cover your face while coughing or sneezing
- **DO THROW** the used tissue immediately into a closed dustbin
- **DO COVER** your sneeze into your bent upper arm in case you are not carrying a tissue or a kerchief.
- **DO WASH** hands immediately after you have covered your sneeze or cough

### DON'T

- **DO NOT** use other ways of covering your face like the *pallu of the sari* or the *chunni* or the *gamcha*
- **DO NOT** spit in the open, always use a spittoon or wash basin for spitting

Source: MoHFW, Gov: [https://www.mohfw.gov.in/pdf/2COVID19PPT\\_25MarchPPTWithAnimation.pdf](https://www.mohfw.gov.in/pdf/2COVID19PPT_25MarchPPTWithAnimation.pdf)

While coughing and sneezing one must always cover face with tissue paper or handkerchief immediately discard used tissue paper in a covered dustbin. If tissue paper or handkerchief is not available, arm/ armpit should be used to control spread of droplets. In case bare hands are used to cover face while coughing or sneezing, they must be immediately washed thoroughly. Covering face with any worn material should be strictly avoided as it becomes an infected medium for spread of the virus. Spitting in the open must be strictly restricted and a spittoon or a wash basin must be used instead.

## Hand Hygiene – Do's & Don'ts

### DO

- **Wash your hands often with soap and water for 40 seconds** especially after you have been in a public place, or after blowing your nose, coughing, or sneezing.
- **Use hand sanitizer** (at least 70% alcohol based) if soap and water not available cover all surfaces of your hands and rub them together until they feel dry.



### DON'T

- **Touch your eyes, nose, and mouth** with unwashed hands.
- **Touch surfaces** like door knobs and door bells, elevator buttons, handrails, support handles, chair backs, ATM surfaces, mobiles, car handles etc



Source: MoHFW, Gov: [https://www.mohfw.gov.in/pdf/2COVID19PPT\\_25MarchPPTWithAnimation.pdf](https://www.mohfw.gov.in/pdf/2COVID19PPT_25MarchPPTWithAnimation.pdf)

During COVID-19 pandemic, hand hygiene has become a key preventive measure. Hands must be washed for at least 40 seconds, scrubbing all areas on the hand and wrist, and for at least 20 seconds if alcohol based hand sanitizer is used. One must never touch face/eyes/nose with unwashed hands. Due care must be taken while and after coming in contact with commonly touched surfaces. Awareness about appropriate habits, hand hygiene and preventive measures are essential for protection against COVID-19.

## Precautions to be taken by Frontline Workers

Please take care of the following after reaching home:



Source: Inputs by Dr Sanjay Pattiwar, Former Health Officer, NMMC  
Image Source: MoHFW, Gol: [https://www.mohfw.gov.in/pdf/2COVID19PPT\\_25MarchPPTWithAnimation.pdf](https://www.mohfw.gov.in/pdf/2COVID19PPT_25MarchPPTWithAnimation.pdf)

Appropriate safety measures must be taken by FLW while at work and after finishing work to prevent the spread of virus in their homes. Care should be taken to avoid touching doors, latches, keys etc. and if touched should be immediately sanitized. Footwear should be removed outside before entering and a bath should be taken immediately. Workers should avoid carrying their work clothes/mask and other apparel home. If this is unavoidable, they should be immediately washed with disinfectant and dried completely.

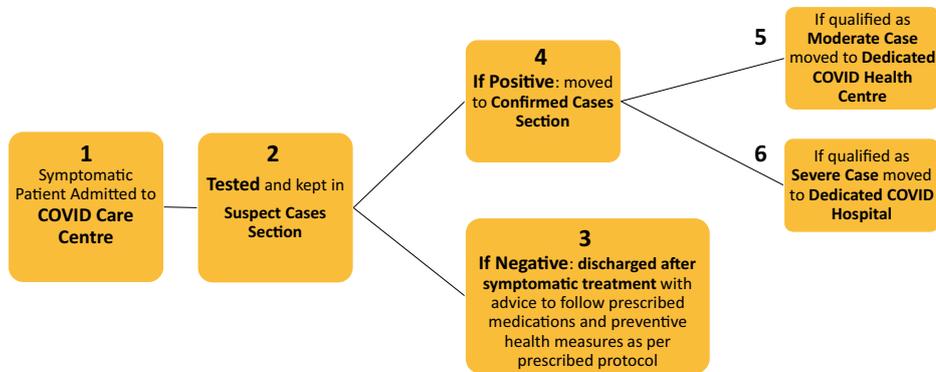
## 1.5. Management & Categorisation of COVID-19 Cases

The following section describes the types of facilities created for treating COVID-19 patients.

## Types of COVID dedicated facilities

### Three types of COVID dedicated facilities

COVID Care Centre (CCC) | Dedicated COVID Health Centre (DCHC) | Dedicated COVID Hospital (DCH)



Source: Presentation on COVID-19 by Dr Vivek R Pardeshi, Surveillance Medical Officer, WHO India

### There are three types of COVID-19 dedicated facilities:

- 1. COVID Care Centre (CCC)** - Suspected and confirmed cases clinically assigned as mild and very mild.  
COVID care centers-1(CCC1): Contacts of positive patients kept under observation for 14 days.  
COVID care centers-2 (CCC2): Asymptomatic positive patients without comorbidity and age less than 60 years kept under observation for 14 days.
- 2. Dedicated COVID Health Centre (DCHC)**- Suspected and confirmed cases clinically assigned as moderate are admitted at DCHC.
- 3. Dedicated COVID Hospital (DCH)**-Suspect and confirmed cases clinically assigned as severe. This categorization helps proper management of COVID-19 suspects and patients requiring critical care.

## 1.6. Stigma and Rumour Monitoring

The following section addresses the issue of stigma linked to COVID-19 and measures to be taken against it.

## Why Is There Stigma?

The level of stigma associated with Covid-19 is based on three main factors:



- Covid-19 is a **new disease** about which many things are still being discovered
- When something is unknown people are worried **which leads to fear**
- Rumours or fake news give **wrong information** and **spreads the fear**



## What Does Stigma Do?



Makes people hide their problems



Keeps people away from accessing health services and seeking help



Discourages them & may at times prevent them from adopting healthy behaviours

Source: MoHFW, GoI: [https://www.mohfw.gov.in/pdf/2COVID19PPT\\_25MarchPPTWithAnimation.pdf](https://www.mohfw.gov.in/pdf/2COVID19PPT_25MarchPPTWithAnimation.pdf)

Corona is a novel virus with newer evidences being discovered everyday leading to myths and misinformation creating fear among people. People tend to conceal their problems and symptoms under fear of taboo and social outcast. This leads to hesitancy in approaching health services and support at the right time and ignorance in following precautions and preventive measures. This must be addressed with appropriate publicity and positive reinforcement through social media, advertisements and counseling as appropriate.

## What Can The Field Level Worker Do?

Field Level Workers and Frontline Staff should be instructed to:



1. Sensitize people and help them to understand that it is a simple infection and **80% of the cases** are **mild cases**
2. Covid-19 **can happen to anyone**, speak to people, be available to listen to how they feel
3. Advise people to engage in **relaxing activities** like indoor games, reading, gardening, home-cleaning, etc.
4. Ask people to **stay away from watching negative things** on the TV and also fake news
5. **Engage community influencers**, share correct information on Covid-19 with them.
6. Brief them on specific support required by you. Guide Whatsapp groups to help in giving hope and **positive news** to help people handle stress.
7. Publicly, use terms like **"People who have Covid-19"** instead of **"Covid-19 cases"** or **"Victims"**. Similarly, use terms like **"People who may have Covid-19"** instead of **"Suspected Cases"**
8. Emphasize that **most people do recover** from Covid-19, amplify the **good news about local people** who have recovered from Covid-19, or who have supported a loved one through recovery
9. Make special efforts to **reach out to high risk groups** including senior citizens and younger children.

Source: MoHFW, GoI: [https://www.mohfw.gov.in/pdf/2COVID19PPT\\_25MarchPPTWithAnimation.pdf](https://www.mohfw.gov.in/pdf/2COVID19PPT_25MarchPPTWithAnimation.pdf)

FLW can play a major role in spreading positive and correct information on COVID-19 with their reach. Health workers can get support of influential leaders and social mobilizers to reduce fear and stress in people's minds. Youth groups and other organizations can help vulnerable senior citizens and children as and when needed.

## 1.7. Psychosocial Health Care of Service Providers

The following section explains the need of addressing the psychosocial issues of health care and service providers and ways in which the same could be addressed.

### Psychosocial Health Care of Service Providers

#### Psychological Support for FLW

- It is quite normal to feeling under pressure in the current situation. It is by **no means a reflection that you cannot do your job** or that you are weak
- **Managing your mental health and psychosocial well-being during this time is as important as managing your physical health**
- Use coping strategies such as ensuring sufficient rest and respite during work or between shifts, eat sufficient and healthy food, engage in physical activity, and stay in contact with family and friends
- **Avoid** use of **tobacco, alcohol or other drugs**
- Some healthcare workers may unfortunately experience **avoidance by their family or community** owing to stigma or fear. **Stay connected** with loved ones **including through digital methods**
- Turn to your colleagues for social support – your colleagues may be having similar experiences to you.

**8046110007**

Toll Free Helpline for  
Healthcare Workers facing  
Stress Launched by MoHFW



Stress Management Training  
Modules are available on website of  
MoHFW, GoI



**1800-102-4040**

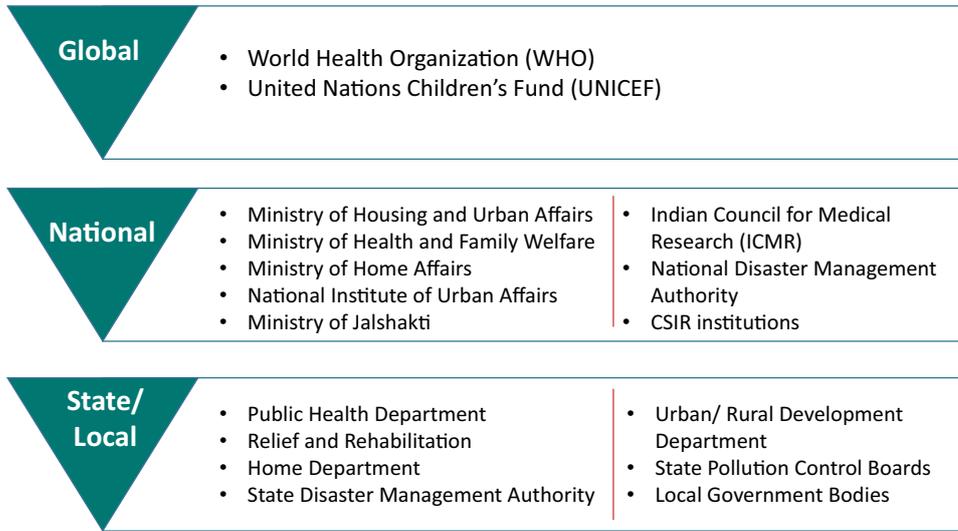
**SAMVAAD**  
Toll Free Mental Health  
Helpline for General Public  
Launched by GoM

Source: WHO: <https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf>

FLW deal with added stress while performing their duties in this pandemic. Thus, it is essential for them to maintain good health, be physically and mentally fit and adhere to a wholesome diet. Digital media can be effectively used to be in contact with families in case personal visits are restricted. Smoking, consumption of alcohol and tobacco and any such addiction must be strictly prohibited as they may increase susceptibility to the infection. Workers should not hesitate in using help line services provided for psychological counselling as needed.

**Reference link:** <https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf>

## Key Agencies Involved in COVID-19 Pandemic Control



COVID-19 pandemic is a global emergency and multiple agencies are working together for prevention and control of this pandemic. Above mentioned agencies are working together at global, national and state/local levels.

## References

- Ministry of Health and Family Welfare, Government of India (March 2020), *COVID-19, Response and Containment Measures*.
- World Health Organisation (February 2020), *Report of WHO China Joint Mission, February 2020*.
- World Health Organisation Mumbai (May 2020), *Presentation on Public Health Aspects of COVID-19*.
- World Health Organisation (March 2020), *Mental health and psychosocial considerations during the COVID-19 outbreak*.



**Water Sanitation and  
Hygiene - Precautions,  
Preventive Measures and  
Good Practices**



---

## Session 2: Water Sanitation and Hygiene-Precautions, Preventive Measures and Good Practices

 Duration: 20 minutes

---



### Need of the session

Provision of safe water supply and sanitation services to protect human health during the pandemic of COVID-19 is one of the crucial aspects to avoid indirect human to human transmission of the virus. Various government advisories have been issued by Central and State governments to address the emerging challenges in Water, Sanitation and Hygiene (WASH). In the context of the situation posed by the pandemic, officials and staff of ULBs have been incessantly working on ground for provision of consistent services. Sanitation and allied FLW are one of the most vulnerable due to their exposure to the virus. Thus, these officials and workers while dealing with such scenario, should have appropriate training of Standard Operating Procedures (SOPs) and precautions while working on ground as well as a good understanding on the facts and myths associated with COVID-19 and WASH.

### Key points covered

The session aims to cover the following:

- Precautions and preventive measures under sanitation and waste management for sanitation workers/ toilet operators/ cleaners/ waste collectors while operating in slums/ high density areas, containment zones etc.
- Hygiene/cleanliness measures to be taken at community toilets/ public toilets (CTs/PTs) and community water points.
- Sanitization / disinfection: Preparation of safe concentration, storage and handling.
- Safe management of water supply services.
- Safe management of sanitation services – Sewerage Treatment Plants (STPs) and Faecal Sludge Treatment Plants (FSTPs).
- Appropriate safety gear for sanitation workers and it's donning doffing.

## Reference notes

### **Cleanliness of surfaces, community water and sanitation points**

The most effective way of containing the disease in areas where common facilities such as bathrooms and toilets are shared, is to implement measures that can catalyse behaviour change and promote strict adherence to hygiene and sanitation practices. (Office of the Principal Scientific Adviser to the GoI, April 2020). Simple precautions and interventions by community members as well as caretakers implemented appropriately can help control the spread of the disease.

### **Community hand wash stations**

Common surfaces at shared hand wash facilities like handles, knobs, doors etc. are major source of disease spread in a community. It is recommended to use foot operated pedaled handwashing stations at shared community spaces to enable the residents to wash their hands frequently without touching the tap. These hand washing stations will control the spread of disease while reducing the amount of water used. To eliminate the use of soap, chlorine can be added to the water. Two design options of such foot operated stations are given in the 'Guidelines for Hygiene and Sanitation in Densely Populated Areas, during the COVID-19 Pandemic'. Foot operated handwashing stations are globally adopted measures during epidemics for controlling the spread of disease.

### **Community/public toilets**

Lack of hygiene and ill-used and ill-maintained CTs may lead to spread of the disease. To prevent this, users must maintain physical distancing at all times and avoid touching the surfaces as much as possible. If any surfaces are touched, they should be immediately washed with soap and water. Caretakers of CTs should ensure that soaps or hand sanitizers are available at the toilet premises and encourage its usage by toilet users. Caretakers should also clean frequently touched surfaces (door handles, armrests, table tops, light switches, water tops) frequently (once every 2-4 hours) with disinfectant. While doing all this, caretakers must strictly adhere to wearing all the recommended safety gear i.e. mask, gloves, apron and boots and keep work and home clothes separate.

### **Precautions and preventive measures for sanitation workers**

Government of India has released multiple guidelines and advisories to be followed by state governments as well as contractors employing sanitation workers. Local governments are advised to put in place SOPs to ensure health and safety of sanitation workers including lists of DO's and DON'T's to be practiced while performing their duties on field every day. Sanitation workers are to be provided with appropriate safety gear like masks, gloves, boots, aprons and the usage of these must be ensured by ULBs and contractors to minimize their risk to the virus. Sanitation workers must be orientated on the procedure of donning and doffing of the safety gear. It should be made sure that the sanitation workers are aware that safety gear is not an alternative to basic preventive public health measures such as hand hygiene, respiratory etiquettes etc. which must be followed at all times.

### **Sanitization and disinfection**

WHO has prepared a guide with recommended handrub formulations which can be used by local manufacturers to prepare accurate hand rubs to be used by the communities. Apart from this, ULBs should ensure clean toilets, walls and surfaces with chlorine containing disinfectant by thorough floor mopping, spraying or wiping three times a day. Sanitary workers must use separate set of cleaning equipment for toilets (mops, nylon scrubber) and separate set for sink and commode. Guidelines on disinfection of common public places released by central government must be followed.

## **Safe management of water supply and sanitation services**

WHO on 19<sup>th</sup> March 2020, released an interim guidance document which supplements the Infection Prevention and Control (IPC) documents by summarizing WHO guidance on water, sanitation and health care waste relevant to viruses, including corona viruses. Based on this, Ministry of Housing and Urban Affairs (MoHUA), Government of India published an Advisory on 'Safe Management of Water Supply and Sanitation Services during COVID-19 Crisis' in April 2020. It is intended for ULBs and water supply and sewage practitioners and services providers for awareness about the risk and practices associated with water supply and sewage.

### **Water supply**

The COVID-19 virus survival time depends on a number of factors, including the type of surface, temperature, relative humidity, and specific strain of the virus. It was reported that effective inactivation could be achieved within 1 minute using common disinfectants, such as 70% ethanol or sodium hypochlorite. (MoHUA, April 2020). Based on existing evidence, the virus is not detected in drinking water supply. Hence risk to water supply is low. Nonetheless, evidence has suggested that the virus remains active in faeces 11.2 days after recovery. As many Indian cities have intermittent water supply, there are high chances of sewage inflow in water supply routes.

As per the advisory, conventional, centralized water treatment methods that use filtration and disinfection (chlorine, ultraviolet (UV) light, and other oxidants) should inactivate the virus. WHO guidelines recommend, a residual concentration of free chlorine of  $\geq 0.5$  mg/L after at least 30 minutes of contact time at  $\text{pH} < 8$  shall be applied for the centralized disinfection during the outbreak.

### **Sewerage and septage treatment**

There have been evidences of excretion of SARS-CoV-2 coronavirus in an infected person's stool. Though it is unlikely that sewerage systems become an important route of transmission of the virus, as the number of cases increase in communities, it may also increase the amount of viruses flowing in the sewerage systems. Strict operation and maintenance protocols which are already prescribed must be followed in all STPs. Appropriate dosage of chlorination must be ensured in the STPs for disinfection as suggested in Manual of Sewerage and Sewage Treatment Systems, 2013, published by MOHUA.

For majority of Indian cities who do not have centralized sewerage treatment systems, the entire sanitation service chain from collection to treatment and disposal need to be strictly monitored as measure of precaution. All sanitary workers must be mandated to use safety gear and physical distancing must be followed. It must be ensured that vehicles for transportation of septage should not have any leaks.

# Training content

## 2.1 Cleanliness of surfaces and community sanitation

The first section of this session starts with cleanliness of surfaces and precautions to be taken in community sanitation.

### Cleanliness of surfaces and community sanitation points

#### For USERS of community toilets



Ensure **safe physical distancing** near toilets. Users should be asked to avoid touching surfaces as much as possible and put soap, water on the surfaces if touched



Never enter a toilet with bare feet and **always wear a footwear**



**Avoid overcrowding** at the wash area

Source: Guidelines for Hygiene and Sanitation in Densely Populated Areas, During the COVID-19 Pandemic, Office of the Principal Scientific Adviser to the Government of India, April, 2020

Many slum dwellers in dense urban areas use CTs where risk of transmission of virus is high. Users of CTs should strictly avoid spitting, blowing nose etc. and ensure safe physical distancing near toilets. All the users should use masks and wash hands with soap before and after use of toilet. Users should also strictly wear footwear, avoid unnecessarily touching any surfaces, their mouth, nose or eyes.

**Reference link:** [http://164.100.117.97/WriteReadData/userfiles/PSA\\_DenseAreaGuidelines\\_Version8.pdf.pdf](http://164.100.117.97/WriteReadData/userfiles/PSA_DenseAreaGuidelines_Version8.pdf.pdf)

## Cleanliness of surfaces and community sanitation points

### For USERS of community toilets



No crowding



Wear Mask



Wear Footwear



Don't Touch nose face, Mouth



Wash hand before & after use of toilet



Do not spit



Avoid touching surface

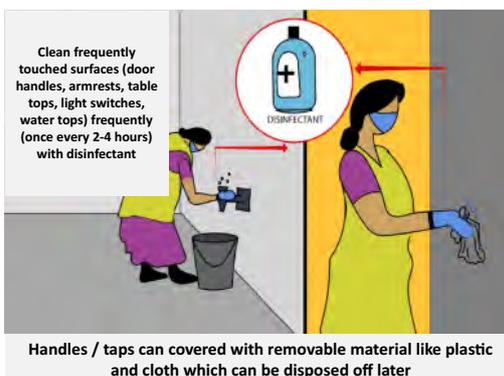


Do not Sneeze

Users should avoid crowding, spitting, sneezing, blowing nose and avoid touching surfaces like railings, walls etc. Such precautions will help in avoiding transmission of virus in the community.

## Cleanliness of surfaces and community sanitation points

### For CARETAKERS of community toilets



Source: Indian Institute of Human Settlements, Practitioners resources by NIUA, 2020, SCBP Portal - Response to COVID-19

As CTs have high footfall, they are with one of the most vulnerable spots in dense communities. The caretakers of CTs play an important role by regular cleaning and maintenance of toilets. First and foremost, the caretakers should protect themselves by wearing appropriate safety gear. Frequently touched surfaces like walls inside toilets, wash basin, counter, taps, door handles, armrest, light switch, toilet tools, buckets, broom, duster, mop, walls, railings etc. should be disinfected regularly.

Reference link: <https://scbp.niua.org/content/practitioners-resources-part-b>

## Cleanliness of surfaces and community sanitation points

### For CARETAKERS of community toilets



Clean the toilet bowl at least two to three times per day. Depending on the usage clean more often



While cleaning a toilet bowl, wear protective gloves  
Apply detergent on the toilet bowl, on both sides of the lid and on the seat (for western) and footrest (for Indian). Flush the toilet  
Apply the toilet bowl cleaner on the bowl while paying special attention to stains. Clean the bowl with a toilet brush.  
Wash the brush when you flush the toilet.  
Disinfect the gloves and put them in their designated container.

Source: Indian Institute of Human Settlements, Practitioners resources by NIUA, 2020, SCBP Portal - Response to COVID-19

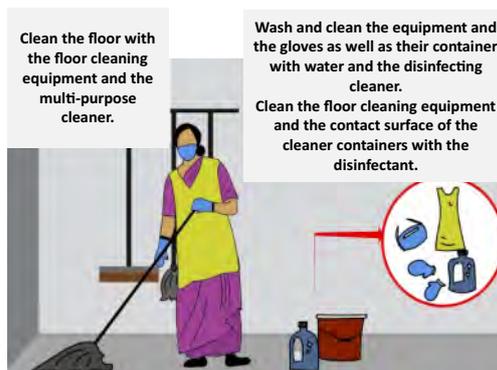
Caretakers should clean toilet pans, floor and side walls at least 2-3 times a day by using detergent, disinfectant or any cleaning agent. While on duty, caretakers must wear boots, hand gloves, apron, and mask. After use of safety gear for cleaning, they need to be disinfected, dried and stored in an appropriate location.

## Cleanliness of surfaces and community sanitation points

### For CARETAKERS of community toilets



Wear gloves, disinfect door handles, taps, shower, mirrors and soap dispensers in the toilet with a wet cloth and disinfectant. Put the cleaning cloth in the laundry bag.



Clean the floor with the floor cleaning equipment and the multi-purpose cleaner.

Wash and clean the equipment and the gloves as well as their container with water and the disinfecting cleaner.

Clean the floor cleaning equipment and the contact surface of the cleaner containers with the disinfectant.

Source: Indian Institute of Human Settlements, Practitioners resources by NIUA, 2020, SCBP Portal - Response to COVID-19

Caretakers should clean soiled hand gloves, disinfect door handles, taps, shower, mirrors and soap dispensers in the toilet with a wet cloth and disinfectant. Cleaners/clothes used for cleaning can be soaked in hot water with disinfectant and dried in sun.

## Cleanliness of surfaces and community sanitation points

### For CARETAKERS of community toilets



Source: Indian Institute of Human Settlements, Practitioners resources by NIUA, 2020, SCBP Portal - Response to COVID-19

Dust bins in the CTs should have a cover and be lined with plastic bags. These bags should be easily removable and leak proof. They should be properly tied/closed before giving for disposal to avoid contamination. After disposal, worn hand gloves must be washed and disinfected followed by cleaning of hands up-to elbow with soap and water.

## Cleanliness of surfaces and community sanitation points

### For CARETAKERS of community toilets



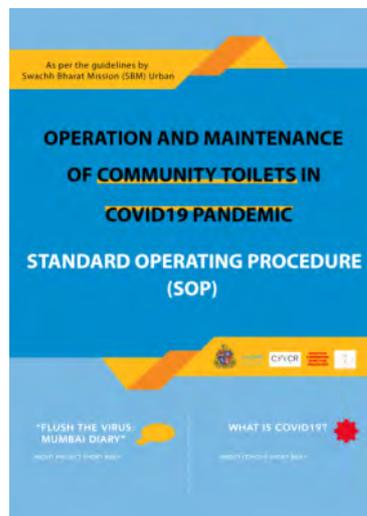
Source: Indian Institute of Human Settlements, Practitioners resources by NIUA, 2020, SCBP Portal - Response to COVID-19

After cleaning and disinfecting the entire toilet at the end of the day, Caretakers should have a bath and wash their clothes used during the day. These clothes should be disinfected and dried well. Footwear should also be cleaned. Apparel used throughout the day should not be carried home. Work wear and regular wear should be kept separate.

## SOPs on O&M of Community Toilets during COVID-19 Pandemic

**Standard operating Procedures (SoPs)** for operation and maintenance of community toilets are being developed by MCGM to provide clear step-by-step procedure for cleaning of CTs by Community Based Organizations, either by their own staff or through private contractors.

This SOP is developed based on compilation of information available on SBM (U), secondary information, knowledge, field experience, and general practices to **provide guidance to CBOs and Urban Local Bodies and their staff for providing better toilets, in a consistent and sustainable manner.**



A set of SoPs for operation and maintenance of CTs are being developed by MCGM based on information available on SBM urban, secondary information and field experience. These provide step-by-step actions to be taken for cleaning of CTs either by Community Based Organizations (CBOs), their own staff or through private contractors for providing better services with appropriate prevention measures.

## SoPs on O&M of Community Toilets during COVID-19 Pandemic

### Contents of the document

#### SOP for Caretakers / Sanitation workers

- Hand hygiene practices
- Guidelines for
  - Before leaving home for work
  - At the Workplace
  - After leaving the Workplace
- Cleaning of Urinals/Toilets /Wash Basins
- Social Distancing ( Physical Distancing) norms

#### SOP for Beneficiaries/users of CTs

- Hand hygiene practices
- Social Distancing ( Physical Distancing) norms

### Checklist FOR USERS, CARETAKERS AND CBO REPRESENTATIVES

Sr.No	Particulars
<b>FOR USERS</b>	
<b>GENERAL FOR MALE &amp; FEMALE</b>	
1	Wash hands with Soap and Water (as per guidelines).
2	Wash hands with soap before having any food ( as per guidelines)
3	Use of Sanitiser whenever necessary
4	Wash hands with with soap after defecation
5	Always keep the toilet clean for other before you leave
6	Always wear chappal/shoes while visiting toilet
7	Do not spit inside the toilet or around the toilet
8	Do not chew Tobacco/Gutkha inside the toilet or around the premises
9	Do not smoke inside the toilet or around the premises
10	Wear chappals while coming to the toilet

The document contains SOPs along with checklists for users as well as caretakers of CTs related to hand hygiene practices, cleaning of toilets, physical distancing norms and DO's and DON'T's before leaving home, at workplace and after leaving workplace. This document can be used by CTs as a reference document and can be adapted based on site-specific requirements.

## 2.2 Good Practices of Community Sanitation

The following section shows some practices followed by ULBs to avoid transmission of virus in dense communities in the urban areas. These can be replicated as suitable.

### Sanitary facilities management - community/ public toilets

**Social Distancing in community toilets have been maintained in many cities in Maharashtra by demarcating circles approx. at 1 meter. San workers, care takers appointed to monitor**



Pachora, Maharashtra



Nasrapur, Andhra Pradesh



MCGM, Maharashtra

Source: Compendium of Good Practices for Small and Medium Towns – Focus on sanitation by Center for Water and Sanitation (C-WAS), CRDF, CEPT University April 2020  
Safely Managed Sanitation Good Practices By Narsapur, Andhra Pradesh State, Compiled By ASCI

The above images show physical distancing norms in CTs followed by ULBs in Maharashtra and Andhra Pradesh. Physical distancing should be strictly followed by all users while using the CTs.

*Reference link: <https://scbp.niua.org/emergency-response>*

## Sanitary facilities management – handwashing facilities

Some cities have taken steps to provide hand washing facilities with water supply in near medical stores, markets, slums and near 'Hot Spots'



Ramtek,  
Maharashtra



Pachora, Maharashtra



MCGM, Maharashtra



Shahada,  
Maharashtra

Source: Compendium of Good Practices for Small and Medium Towns – Focus on sanitation by Center for Water and Sanitation (C-WAS), CRDE, CEPT University April 2020

'Necessity is the mother of invention'. During the Pandemic local innovations are observed which are simple to use and less expensive. The above images show hand cleaning techniques which have been adopted by ULBs in Maharashtra.

## Sanitary facilities management- handwashing facilities

Mobile handwashing facility for slum dwellers

Installation of water tanker to a modified open vehicle with four tap connections and four wash basins.



Nandyal Municipal Corporation, Andhra Pradesh



MCGM, Maharashtra

Source: Fight Against COVID-19, Sample Best Practices by Urban Local Bodies- Presentation by MoHUA, GoI

Innovative hand washing techniques have been developed by communities in Nandyal Municipal Corporation in Andhra Pradesh. Hand basins have been installed on mobile trolleys with a water tanker.

Reference link: <https://cdn.cseindia.org/docs/Best-Practices-COVID-Response/1Best-Practices-by-States-and-ULBs.pdf>

## Involvement of volunteers in Mumbai, Maharashtra



The above images show involvement of volunteers to help deal with the situation in the Dharavi slum in Mumbai. Volunteers have contributed in activities like spreading awareness in CTs, distribution of disinfectants, sanitizers and medical check-up of sanitation and allied workers.

## Sanitary Facilities Management for Sanitation Workers

### Welfare and protection of sanitary workers on field

- Most ULBs have been using the 14th FC funds for procuring PPE
- PPE are procured locally, some have released short tender to supply the PPEs on urgent basis
- Sanitizers and soaps along with PPE have been give to san workers
- Apart from PPE and sanitizer provision awareness generation sessions also conducted



Wai, Maharashtra



Kalameshwar, Maharashtra

Source: Compendium of Good Practices for Small and Medium Towns – Focus on sanitation by Center for Water and Sanitation (C-WAS), CRDF, CEPT University April 2020

Use of safety gear is extremely crucial for all the sanitation workers. Appropriate gear like boots or shoes, masks, hand gloves, plastic face sheets etc. should be provided which are washable and reusable. Training on donning doffing of safety gear should be provided to the workers.

## Sanitary Facilities Management for Sanitation Workers

### Health check-up for MCGM as well as contractual workers

1. Health check-up of the workers MCGM and contract worker
2. Awareness session about COVID-19.
3. Check-up for hypertension and diabetes
4. Thermal screening of the workers to check if worker are emitting symptoms of the virus.
5. Workers who require further medication are referred to clinic to avail treatment.
6. Provision of medical masks , Homeopathy tablets or supplementary vitamins as per Ayush guidelines



COVID -19 Awareness



BP & Diabetic check up



Sanitizer distribution

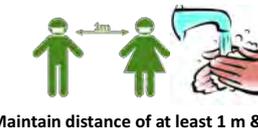
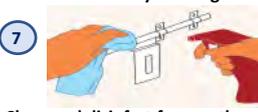
Medical camp and awareness of COVID-19 to workers is very helpful to build their moral and confidence while working on ground. Medical check-ups can include blood sugar, blood pressure, pulse check and thermal screening. Workers who require further medication are referred to clinics to avail suitable treatment. Provision of supplements for immunity boost as per Ayush guidelines of workers is also valuable.

## 2.3 DO's and DON'T's for Sanitation workers

The following section details out things to be done and things to be avoided for sanitation workers based on their type of work on field.

## Dos and Don'ts for Safai Karmacharis – CT/PT cleaners

**When you reach the workplace, you must**

-  Wash hands for 20 sec with soap
-  Wear PPEs as per recommendations
-  Draw circles outside the toilet block to make users maintain distance
-  Clean the toilet block by wearing PPEs
-  Maintain distance of at least 1 m & to wash hands with soap after using toilet
-  Collect user charges while wearing gloves
-  Clean and disinfect frequently touched objects and surfaces.
-  Wash hands with soap before having any food
-  Remove gloves and masks, clean them thoroughly with soap water

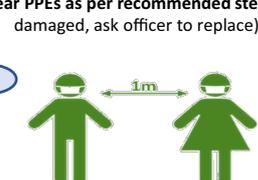
Source: Urban Management Centre, Practitioners resources by NIUA, 2020, SCBP Portal - Response to COVID-19

**For CT/PT cleaners:** Caretakers of the CT/PTs must wash their hands, feet and face frequently, and wear safety gear as recommended. They should ensure physical distancing norms and use coins for money as far as possible which can be cleaned later. All the frequently touched surfaces must be disinfected.

*Reference link: <https://scbp.niua.org/content/practitioners-resources-part-b>*

## Dos and Don'ts for Safai Karmacharis – Desludging operators

**When you reach the workplace, you must**

-  Wash hands with soap for 20 sec
-  Wear PPEs as per recommended steps (if damaged, ask officer to replace)
-  Pick cleaning equipment and vehicle only after wearing PPE
-  Carry water in the vehicle, soap/ alcohol-based sanitizer
-  Sit at opposite corners of the seats to maintain distance
-  Avoid touching your eyes, nose, and mouth and mask while wearing it

Source: Urban Management Centre, Practitioners resources by NIUA, 2020, SCBP Portal - Response to COVID-19

**For Desludging Operators:** Desludging operators must use their tools and use the vehicle only after wearing safety gear as recommended. They must wash their hands, feet and face frequently, and carry self-cleansing kit like water, soap and sanitizers in the vehicle to be used as needed. During desludging operation, they should clearly barricade the area and use lime powder in case of any spillage. Desludging pipe should not be touched without wearing gloves and after emptying the sludge, the pipes and barricades must be thoroughly cleaned with disinfectant. Desludging vehicles and tools should also be disinfected every day.

## Dos and Don'ts for Safai Karmacharis –D- D Waste collector

When you start your work, follow these steps...



1 Blow horn to open the gate

2



Keep distance of minimum 4 feet from citizens

3



Ask citizens to throw their waste directly in the vehicle/ your bin

4



Do not touch dustbins and waste with bare hands

5



Do not collect waste from a quarantined household unless you are informed by the municipality

6



Ask citizens to dispose used masks and gloves in a separate bag

7



Use sheet/pan to pick up littered waste

8



Take extra care while picking up waste may carry saliva etc. ice-cream stick,

Source: Urban Management Centre, Practitioners resources by NIUA, 2020, SCBP Portal - Response to COVID-19

**For Door to door waste collectors:** Waste collectors must not touch dustbins and waste with bare hands and as far as possible, ask citizens to throw waste directly in the bin or waste collection vehicle. Waste from quarantined households should be collected separately. Extra care should be taken while collecting waste which may carry saliva e.g. ice cream sticks etc.

## Dos and Don'ts for Safai Karmacharis – Drain cleaners

When you reach the workplace, you must

1



Wash hands with soap for 20 seconds at least

2



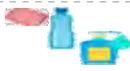
Wear mask, gumboots, apron and gloves (if mask is not available, then use a clean cloth in 2-3 layers to cover your nose and mouth)

3



Pickup the equipment like shovel, hoe & barricade cone & ribbon only after wearing PPE

4



Carry bottles of water/ soap to wash our hands thoroughly when they want to take a break

5



Carry own lunch & drinking water

6



maintain 1 meter distance with your co-workers or with others

7



Remove debris and trash from the drain and surrounding area using equipment only. Do not touch anything with bare hands

8



Clean the area by sweeping, bleaching, disinfecting and complete sanitization

Source: Urban Management Centre, Practitioners resources by NIUA, 2020, SCBP Portal - Response to COVID-19

**For Drain Cleaners:** Drain cleaners should also follow similar instructions while working on ground. Care should be taken that everything is touched by equipment only and not with bare hands.

## Dos and Don'ts for Safai Karmacharis – FSTP operators

**When you start your work, follow these steps...**

-  **Maintain safe distance with co-workers, don't sit together if possible**
-  **Collect sample with caution when receiving fecal sludge**
-  **Do not touch unnecessary objects**
-  **Disinfect high touch surfaces – water taps, stair rails, door handles etc. once every 2-4 hours**
-  **Wash eyes, nose, face in case waste touches**
-  **Spillage of fecal matter to be sprinkled with lime powder and disinfected**
-  **Wash hands with soap before and after having lunch. Also, after having performing any task with possible exposure to faecal sludge, touching register or cleaning the surrounding**

Source: Urban Management Centre, Practitioners resources by NIUA, 2020, SCBP Portal - Response to COVID-19

**For FSTP operators:** FSTP operators should also follow similar instructions while working on site. All surfaces must be regularly sanitized and in case of spillage of faecal matter, lime powder should be sprinkled and the surface should later be disinfected.

## Dos and Don'ts for Safai Karmacharis – Before and after work

**Before leaving home for your work, you must**

-  **1. Wear full sleeve and full-length clothes**
-  **2. Cover wounds with water-proof band-aid**
-  **3. Carry the Emergency pass issued by ULB**
-  **4. Carry water and soap to wash hands**
-  **5. Gloves, mask, apron (if mask is not available, then use a clean cloth in 2-3 layers to cover your nose and mouth)**
-  **6. Carry extra set of clothes**

**When you finish your work**

-  **Remove safety gears**
-  **Wash hands and face**
-  **Change clothes and put all in a bag**
-  **Wear mask/cloth and return to home**
-  **Before meeting anyone in the family, first wash clothes and PPEs with soap and hang them in a sunny dry place**

Source: Urban Management Centre, Practitioners resources by NIUA, 2020, SCBP Portal - Response to COVID-19

**Before leaving for work:** All workers must wear full length clothes and safety gear over the clothes. Extra set of clothes should be carried in case of contamination. Essentials like water, food, soap/sanitizer, Band-Aid etc. must be carried. **After finishing work:** Safety gear must be removed appropriately and disinfected. Hands, feet and face should be washed with soap. Mask should be worn even while travelling to home after work.

## Sanitary Facilities Management for Sanitation Workers

### Provisions in Sanitation and Waste Management Facilities/ chowkis



**facilities for regular hand hygiene** using appropriate technique



**Provision of individual hand sanitizers** to staff



**provision for regular cleaning and disinfection** of facilities, equipment and PPE



protocols and facilities for **safe management of PPE** and waste



**adequate and accessible toilets facilities for staff**, safe excreta management



**provision of safe drinking-water** to staff and facilities to **disinfect regularly**



**water supply for personal hygiene**, laundry and cleaning

Source: Advisory on Safe Management Of Water Supply And Sanitation Services During Covid-19 Crisis, MoHUA, GoI, April 2020

Chowkis where workers assemble every morning need to be equipped with good hand wash facilities, toilets, safe drinking water, sanitizers, dust bins, safety gear, provision of water for washing clothes, shoes etc. Chowkis should also be disinfected regularly and cleanliness should be maintained.

**Reference link:** <http://mohua.gov.in/pdf/5edf84915e23aCOVID%2019%20-%20Advisory%20on%20Water%20and%20Sanitation%20Services.pdf>

## 2.4 Sanitization/ Disinfection

The next session deals with sanitization/ disinfection preparation as per guidelines recommended and practices for hand hygiene in communities.

## Sanitization/ disinfection – Guide prepared by WHO



Source: WHO-recommended Hand rub Formulations, WHO, 2010

This Guide to Local Production of WHO-recommended Handrub Formulations consist of two sections:

### Part A

provides a practical guide for use at the pharmacy bench during the **actual preparation of the formulation**.

### Part B

Within Part B the user has access to important **safety and cost information** and supplementary material relating to dispensers and distribution.

Given the pandemic, a number of hand rub solutions are available in market. Supervising staff who are directly involved in site operations should be aware about contents of approved hand rub solution. There are guidelines available by WHO on recommended hand rub formulations (2010) which can be distributed among the relevant staff as needed.

*Reference link:* [https://www.who.int/gpsc/5may/Guide\\_to\\_Local\\_Production.pdf?ua=1](https://www.who.int/gpsc/5may/Guide_to_Local_Production.pdf?ua=1)

## Sanitization/ disinfection – Guide prepared by WHO

### PART A: GUIDE TO LOCAL PRODUCTION

- Step-by-step guide on the process of production and materials required for small volume production
- Step-by-step guide on the process of production and materials required for production of 10 Litres
- Quality control measures
- Production and storage facilities

### PART B: SUPPLEMENTARY TECHNICAL, SAFETY AND COST INFORMATION

- Background to WHO alcohol-based hand-rub formulations
- Key lessons learned from around the world
- Distribution
- Safety Standards
- Cost information
- Summary table of risks and mitigation measures concerning the usage

Source: WHO-recommended Hand rub Formulations, WHO, 2010

The WHO recommended hand rub formulations are divided in two parts. The first parts deals with materials required, production of volume up to 10 liters and storage facilities. The second part deals with technical information on distribution, safety and cost. The liquid so produced should follow prescribed safety standards and should be cost effective so that same can be used in public areas.

## Handwashing in shared community spaces

### Need for a alternative to conventional handwashing system

Common surfaces like handles, knobs, doors etc. are major source of disease spread in a community.

### Innovative solution

Non touch pedal operated hand washing stations

- It is recommended that foot-operated handwashing stations are installed at all community points to enable residents to frequently wash their hands.
- These hand washing stations will control the spread of disease while reducing the amount of water used.
- To eliminate the use of soap, chlorine can be added to the water.



Foot operated handwashing stations are globally adopted measures during epidemics for controlling the spread of disease.

Source: Guidelines for hygiene and sanitation in densely populated areas, during the COVID-19 pandemic- Office of the Principal Scientific Advisor to the Government of India, April, 2020

The spread of the virus is mainly through hands hence alternative systems to conventional handwashing are recommended. Pedal operated handwashing facilities are suggested to be installed in communities with shared facilities to enable handwashing without touching the taps by hands. Innovative solutions for different techniques should be encouraged.

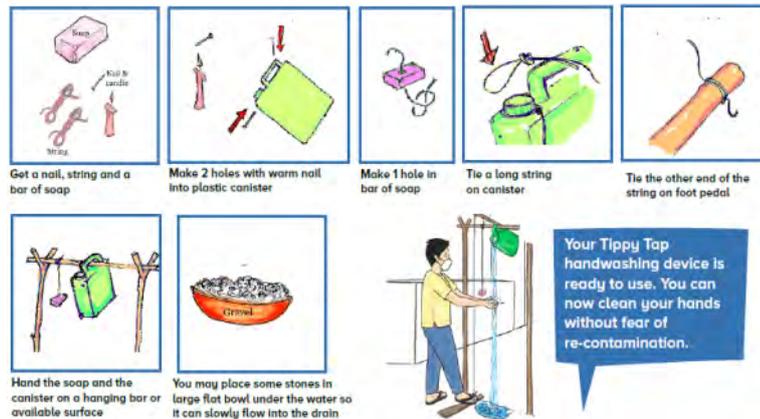
Reference link: [http://164.100.117.97/WriteReadData/userfiles/PSA\\_DenseAreaGuidelines\\_Version8.pdf.pdf](http://164.100.117.97/WriteReadData/userfiles/PSA_DenseAreaGuidelines_Version8.pdf.pdf)

## Handwashing in shared community spaces

### Option 1-

#### Installing foot operated handwashing stations outside homes

- The unit can be installed for every 3-4 households.
- Average material cost of one unit would be approximately Rs. 100.



Process of making a handwashing stations

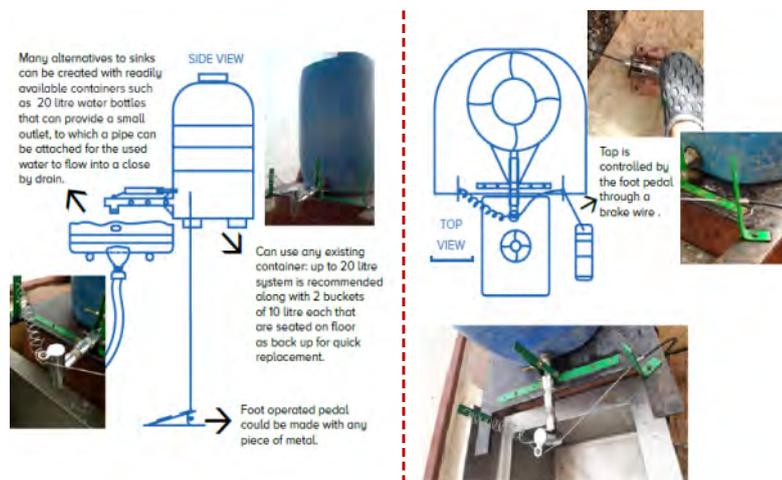
Source: 1. Guidelines for hygiene and sanitation in densely populated areas, during the COVID-19 pandemic- Office of the Principal Scientific Advisor to the Government of India, April, 2020  
2. Illustrations and process from tippytap.org

For smaller scale of ULBs, it is advisable to go for low cost technique of pedal operation which can be quickly installed in communities for use. It should be ensured that the material used should be available easily.

## Handwashing in shared community spaces

### Option 2-

#### Installing foot operated handwashing stations at community toilets and other areas



Process of making a handwashing stations

Source: 1. Illustrations and process from tippytap.org

2. Guidelines for hygiene and sanitation in densely populated areas, during the COVID-19 pandemic- Office of the Principal Scientific Advisor to the Government of India, April, 2020

As suggested in 'Guidelines for hygiene and sanitation in densely populated areas during COVID-19 pandemic' by GoI, simple mechanisms can be used for installation of foot operated handwashing stations. These mechanisms can be developed by using lever, brakes wires, etc.

## Cleanliness of surfaces and community sanitation points

### Disinfectants

**Clean streets, toilets and walls with chlorine containing disinfectant by thorough floor mopping, spraying or wiping three times a day.**

**Concentration of Chlorine based Disinfectant Solution to be used:**

Available Hypochlorite Solution (Bleach, Phenyl)	Required Chlorine Concentration	To Prepare 1000ml	
		Chlorine Solution in ml	Add water in ml
5%	1%	200	800
10%	1%	100	900

- Authorities may consider **spray cleaning of specific areas** as needed.
- Authorities may consider providing a alternative to soap-based handwashing, using a chlorine based hand rub solution, dispersed in controlled conditions in public areas. This measure will reduce the amount of water needed.

Source: Guidelines for Hygiene and Sanitation in Densely Populated Areas, During the COVID-19 Pandemic, Office of the Principal Scientific Adviser to the Government of India, April, 2020

It is advisable to clean streets, toilets and walls with the help of Hypochlorite solution mixed in proper concentration with water. This should be done at least 3 times a day. It should be noted that these precautions should not be treated as relaxation from appropriate hand hygiene and physical distancing norms as far as prevention of COVID-19 is concerned.

## 2.5 Safe management of water supply and sanitation services

The following session deals with delivery of safe management of water supply and sanitation services in ULBs.

### Safe management of water supply and sanitation services



- The provision of **safe water supply and sanitation services is essential** to protect human health during all infectious disease outbreaks, including the COVID-19 outbreak.
- The application of **good and consistently water and sewage management practices** at Urban Local Body will help to prevent indirect human-to-human transmission of the COVID-19 virus.
- **The COVID-19 virus survival time depends on a number of factors, including the type of surface, temperature, relative humidity, and specific strain of the virus.**

Source: Advisory on Safe Management Of Water Supply And Sanitation Services During Covid 19 Crisis, MoHUA, GoI, April 2020

Without safe management of water supply and sanitation, control of any infectious disease is difficult. Provision of safe water and sanitation services is essential in prevention of indirect transmission of the virus. Hence these services need to be monitored closely.

**Reference link:** <http://mohua.gov.in/pdf/5edf84915e23aCOVID%2019%20-%20Advisory%20on%20Water%20and%20Sanitation%20Services.pdf>

## Safe management of water supply and sanitation services

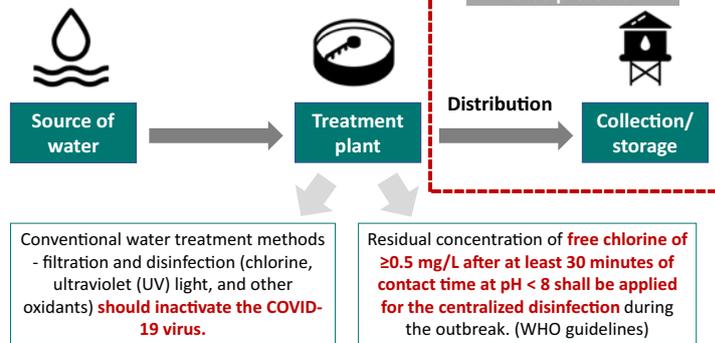


### Water supply

The COVID-19 virus has not been detected in drinking-water supplies, and based on current evidence, the risk to water supplies is low.

virus could **remain infectious in water contaminated with faeces for days to weeks.** (11.2 days as per LANCET.com study report)

Mostly in all Indian cities, due to intermittent water supply, there are high chances of the sewage influx in the water supply pipelines



Source: Advisory on Safe Management Of Water Supply And Sanitation Services During Covid-19 Crisis, MoHUA, GoI, April 2020

As on April 2020, there is NO evidence of COVID-19 virus in drinking water supplies. There has been evidence of the virus remaining active in faeces for 11 days as per reports published by LANCET. As many cities have intermittent water supply, there are high chances of sewage influx in water supply pipelines. Conventional, centralized water treatment methods that use filtration and disinfection should inactivate the virus.

## Safe management of water supply and sanitation services



### Water storage and handling

1. Use clean vessels for storage

3. Strain the boiled water

5. Use a separate vessel with handle to remove water

7. Don't immerse hand, fingers



2. Boil water before use

4. Use alum

6. Keep drinking water vessels at a height

8. Keep source of water clean

Source: COVID-19 Swachhagrahis Training module- UNICEF

In places where centralized water treatment and safe piped water supplies are not available, a number of household water treatment technologies are effective in removing or destroying viruses as shown in the figures.

## Safe management of water supply and sanitation services



### Sewerage treatment plants

- There are evidences of excretion of SARS-CoV-2 coronavirus in an infected person's stool for 11.2 days after recovery. The pathogen's increasing circulation in communities may increase the amount of it flowing into the sewer system.
- O&M protocols must be followed properly in all STPs, and performance may be monitored
- A final disinfection step may be considered if existing wastewater treatment plants are not optimized to remove viruses. **Appropriate dosage of chlorination may be decided**, (as per the Manual of Sewerage and Sewage Treatment Systems, 2013, published by MOHUA)
- It is highly recommended that **workers be provided with personal protective equipment** and motivated to use these at all times.



Regular O&M protocols at STP to be followed



Ensuring disinfection



Strict usage of PPE to be ensured

Source: Advisory on Safe Management Of Water Supply And Sanitation Services During Covid-19 Crisis, MoHUA, GoI, April 2020

Sewage can be a potential carrier of most of the diseases including COVID-19 hence sewerage services are always deemed as hazardous. Regular operation and maintenance protocols should be strictly followed and additional care should be taken by way of sanitization/ disinfection etc. Appropriate dosage of chlorination may be decided, depending upon the quality of the effluent, as per the Manual of Sewerage and Sewage Treatment Systems, 2013, published by the MoHUA. Workers should be mandated to use safety gear at all times.

## Safe management of water supply and sanitation services



### Faecal sludge and septage management

For majority of Indian sanitary installations both in urban and rural areas (that do not have centralized sewerage), it is recommended that households are **encouraged to use their toilets and keep these clean**.



Community/public toilets - facilities are **properly maintained and cleaned**, and all sanitary workers are protected.



**Safety and safe-disposal of fecal wastes** must be enforced and monitored. All sanitary workers are protected with PPE.



**Monitoring of the full fecal sludge management chain** needs to be strengthened at this juncture, as a measure of precaution.

Source: Advisory on Safe Management Of Water Supply And Sanitation Services During Covid-19 Crisis, MoHUA, GoI, April 2020  
Sanitation value chain image source: The energy and Resource Institute

Septage is more complicated than sewage in terms of treatment and handling. Entire chain of fecal sludge management shall be monitored closely with all necessary safety precautions. All households should compulsorily make use of toilets and keep them clean. Safe disposal of septage must be enforced.

## Safe management of water supply and sanitation services



### Faecal sludge and septage management

- Desludging of Septic Tanks/Holding Tanks **to be done only if unavoidable**
- Manual desludging to be strictly avoided
- All safety measures to be followed by the sanitary workers including physical distancing
- In case of holding tanks: Extra precaution is necessary. It is recommended to give **lime treatment** (1 part lime solution with 10 parts of sludge)



### Transport of Sludge

- Safety precautions to be followed by workers & drivers
- Vehicle should be in sound condition. No leakages / splash
- Monitoring of vehicles : Should reach the designated sites



### Treatment of Sludge

- Ensure that a proper FSTP exists with all its parameters functional

Source: Virtual Orientation of SBM-G Chhattisgarh Personnel 17.4.2020 by Shrikant Navrekar

Desludging of septic tanks and transportation of sludge can prove fatal if necessary precautions are not taken and hence need to be monitored closely. Manual desludging should be strictly prohibited. Vehicles for transportation should be well maintained and regularly disinfected. Operation and maintenance of FSTPs should be done by monitoring all parameters.

## Safe management of water supply and sanitation services

### Operational Plan for FSTP under COVID-19 Emergency: Interim Guidance

- 1 Routine cleaning**  
Disinfecting all frequently touched surfaces such as workstations, pumps and valves, tools, toilets, floor, countertops, switchboards and door handles.
- 2 FSTP operators' health and hygiene**  
Usage of disinfectants (hand sanitizers, hand wash etc.) at frequent intervals.
- 3 Encourage sick employees to stay home and ensure health care access**
- 4 Mandatory PPE usage at sites**
- 5 Garbage disposal**  
Put the waste like scum, waste from screening units, used gloves, masks and paper towels in suitable garbage bags.
- 6 In case of spillage**
  - The spill has to be cleaned either by sucking up the spill by the vacuum pump into the tank or if that is not possible to cover it with lime.
  - In case that is not possible, then the spill should be washed and the wash water should be directed to a covered drain and chlorine should be sprayed on the spilled area.

Source: Indian Institute of Human Settlements, 2020, NIUA-SCBP Portal – Response to COVID-19

All SOPs for FSTP should be strictly followed with additional measures of sanitization and disinfection. Frequently touched surfaces such as surfaces of workstations, tools of workers, toilets at FSTP, door handles etc. need to be disinfected regularly. Sick employees should be encouraged to stay at home as precaution. Workers should be mandated to wear safety gear as recommended at all times. Potentially hazardous waste from the site like scum, waste from screening units, used safety gear must be disposed in separate garbage bags and indicated likewise to waste collectors. Spillage should be cleaned immediately either with vacuum pump back into tank or covered with lime.

Reference link: <https://scbp.niua.org/liquid-waste-management>

## 2.6 Appropriate combination of PPE and donning/doffing

The last session deals with safety gear and equipment to be used by sanitation workers while working on field.

Safety gear should be selected as per work requirement. Maintenance of these equipment shall be carried out periodically based on type of safety equipment. Safety gear shall be of prescribed standards. The following slides show different types of safety gear and requirement for various type of work.

*Reference link: <https://scbp.niua.org/sanitation-workers-safety-and-handwashing>*

### Appropriate combination of PPE

Type of PPE	Description	Liquid Waste Management (Desludging staff, mechanized sewer cleaning staff and treatment plant staff involved in O&M activities)	Solid Waste Management (Workers involved in door to door collection, working in transfer station, segregation line and at SWM plant)	Solid Waste Management (Workers involved street sweeping)
 <p><b>Hard hat</b></p>	<p>Hard Hat with shell made out of polypropylene co - polymer with headband, harness, sweatband, peak and chinstrap. Recommended for use only when hazard off alling object, working at height or near open chambers.</p>	✓	✓	
 <p><b>Ear plugs</b></p>	<p>Corded, flanged shaped ear plugs made out of non irritant and non allergic material. The ear plugs should be washable and reusable. Recommended for use only in case of noise hazard.</p>	✓	✓	
 <p><b>Face shield</b></p>	<p>Face shield made out of clear polycarbonate having size 8.0" x 15.5" and thickness of 1.0 mm. The shield should be compatible with the safety hard hat.</p>	✓	✓	

Source: By Saniverse, Environmental Solutions, Practitioners' resources by NIUA 2020, SCBP Portal- Response to COVID-

## Appropriate combination of PPE

Type of PPE	Description	Liquid Waste Management (Desludging staff, mechanized sewer cleaning staff and treatment plant staff involved in O&M activities)	Solid Waste Management (Workers involved in door to door collection, working in transfer station, segregation line and at SWM plant)	Solid Waste Management (Workers involved street sweeping)
 <p>Safety goggles</p>	Safety goggles must be light weight made out of clear polycarbonate material offering high impact resistance and 99.9% UV protection.	✓		
 <p>Full Sleeves Shirt</p>	High visibility full sleeves shirt made out of high wicking polyester for comfortable use in hot and humid conditions. Presence of reflective strips for high visibility in low light conditions is optional.	✓		✓
 <p>High visibility safety vests</p>	Safety vests made of plain or mesh polyester, 1 or 2 inch high gloss white or yellow horizontal & vertical reflective tape. Recommended to be worn with apparel in street sweeping activity for high visibility in low light conditions.			✓

Source: By Saniverse, Environmental Solutions, Practitioners' resources by NIUA 2020, SCBP Portal- Response to COVID-19

## Appropriate combination of PPE

Type of PPE	Description	Liquid Waste Management (Desludging staff, mechanized sewer cleaning staff and treatment plant staff involved in O&M activities)	Solid Waste Management (Workers involved in door to door collection, working in transfer station, segregation line and at SWM plant)	Solid Waste Management (Workers involved street sweeping)
 <p>Cargo Pants</p>	Full length Cargo pants made out of polyester and cotton. The pants should have gusseted crotch, wide belt loops and reinforced front and Cargo pockets. Presence of reflective strips is mandatory. The full length pants protects the worker from coming in contact with dusts and harmful substances.			✓
 <p>Full Length Pants</p>	High visibility full length pants made out of polyurethane coated breathable polyester for comfortable use in hot and humid conditions and easy cleaning. Presence of reflective strips for high visibility in low light conditions is optional.	✓		

Source: By Saniverse, Environmental Solutions, Practitioners' resources by NIUA 2020, SCBP Portal- Response to COVID-19

## Appropriate combination of PPE

Type of PPE	Description	Liquid Waste Management (Desludging staff, mechanized sewer cleaning staff and treatment plant staff involved in O&M activities)	Solid Waste Management (Workers involved in door to door collection, working in transfer station, segregation line and at SWM plant)	Solid Waste Management (Workers involved street sweeping)
<b>Foot protection</b> 	Protective footwear having steel toe with upper body made out of grain leather and polyurethane outsole for protection against physical hazards. Ankle length shoes when paired with full pants provides complete protection from incidental splashes of hazardous liquids.	✓	✓	✓
<b>Foot protection</b> 	Protective footwear made out of poly vinyl-chloride and has energy absorption heel. Anti-skid highly flexible and extra strong for protection against physical hazards. These shoes are recommended for jobs in SWM where the worker is going to come in continuous contact with liquid. Ankle length shoes should be paired with full pants provides complete protection.		✓	

Source: By Saniverse, Environmental Solutions, Practitioners' resources by NIUA 2020, SCBP Portal- Response to COVID-19

## Appropriate combination of PPE

Type of PPE	Description	Liquid Waste Management (Desludging staff, mechanized sewer cleaning staff and treatment plant staff involved in O&M activities)	Solid Waste Management (Workers involved in door to door collection, working in transfer station, segregation line and at SWM plant)	Solid Waste Management (Workers involved street sweeping)
<b>N 95 Face Mask</b> 	N 95 Face Mask with exhalation valve and straps made out of Thermo plastic Elastomer, Aluminium nose clip, Polyurethane nose foam, polypropylene filter, polyester shell and cover web.	✓	✓	
<b>Face Mask</b> 	Foldable respiratory half mask made of non- woven polypropylene wide adjustable elastic straps, Aluminium nose clip, Reinforcement nose foam.		✓	✓

Source: By Saniverse, Environmental Solutions, Practitioners' resources by NIUA 2020, SCBP Portal- Response to COVID-19

## Appropriate combination of PPE

Type of PPE	Description	Liquid Waste Management (Desludging staff, mechanized sewer cleaning staff and treatment plant staff involved in O&M activities)	Solid Waste Management (Workers involved in door to door collection, working in transfer station, segregation line and at SWM plant)	Solid Waste Management (Workers involved street sweeping)
 <p>Mechanical Resistant Gloves</p>	<p>Mechanical Resistant, nitrile coated gloves having nylon lining, Specialized grip such as dotted or Sandy and Knitted Cuffs. Recommended to be worn for jobs which might include incidental contact with liquid hazardous waste or chemical.</p>	✓	✓	✓
 <p>Chemical Resistant Gloves</p>	<p>Chemical resistant, nitrile gloves having flock lined inners, diamond finish grip, straight cuff, minimum thickness of 0.38mm and length of 330 mm. Recommended to be worn on jobs which includes continuous and international contact with liquid hazardous waste or chemical.</p>	✓	✓	

Source: By Saniverse, Environmental Solutions, Practitioners' resources by NIUA 2020, SCBP Portal- Response to COVID-19

## Handling PPEs- donning/ doffing

### How to put on and remove PPE?

1. **Cover nose and mouth with mask** and secure ties/elastic band behind the head and neck. **While removing: Front of mask is contaminated – DO NOT TOUCH!** Grasp bottom ties or elastics and remove without touching the front



2. **Wear gloves.** Outside of gloves are contaminated, used gloved hand to remove other glove, follow this procedure to remove other glove.



3. **Wear boots** to cover your legs. Remove boots with gloved hands.



Source: Indian Institute of Human Settlements, Practitioners resources by NIUA, 2020, SCBP Portal- Response to COVID-19

It is important to train the sanitation workers on correct donning and doffing of safety equipment and to make them understand that these are not alternative to basic preventive public health measures such as hand hygiene, respiratory etiquettes which must be followed at all times. Detailed procedure on donning doffing of each equipment should be conveyed and made available to the workers. There should also be strict protocols on disposal of the equipment once it is used.

## References

- Ministry of Housing and Urban Affairs. (April 2020). Advisory on Safe Management Of Water Supply And Sanitation Services During Covid-19 Crisis. Office of the Principal Scientific Adviser to the Government of India. (April 2020). Guidelines for Hygiene and Sanitation in Densely Populated Areas, During the COVID-19 Pandemic. World Health Organisation. (April 2020). Water, Sanitation, Hygiene and Waste Management for the COVID-19 virus, Interim Guidance.
- National Institute of Urban Affairs. (2020). *Practitioners Resources for COVID-19*.
- Centre for Water and Sanitation, CEPT University. (April 2020). *Compendium of Good Practices for Small and Medium Towns – Focus on sanitation*.
- World Health Organization. (2010). *WHO-recommended Hand rub Formulations*.

# 3



## Biomedical Waste Management



---

## Session 3: Biomedical Waste Management

 Duration: 30 minutes with video

---



### Need of the session

Biomedical Waste Management (BMW) Rules, 2016 states that the BMW Rules are applicable to a person who has control over the institution and/or health care establishment. Also, it is the duty of every occupier of an institution who generate, collect, receive, store, transport, treat, dispose, or handle biomedical waste in any form. As the COVID-19 virus is spread through the infected droplets landing of the surfaces, crucial care has to be taken to make sure that the infection is not spread from the waste generated by patients and during the treatment of COVID- 19 patient. This session covers the types of waste generated and collected from the hospitals, health care centers, quarantined households, proper procedure to handle each category of waste and type of disposal based on BMW Rules, 2016 and guidelines issued by MoHUA, MoHFW, National Centre for Disease Control (NCDC), CPCB and MPCB.

### Key points covered

- Rules and responsibilities of authorities managing COVID-19 facilities in dealing with waste generated.
- Safety precautions and standard operating procedures to be followed by healthcare workers.
- Categories of waste generated from different facilities and their disposal methods.

## Reference notes

### Rules and responsibilities of authorities for proper management of COVID-19 waste

Officers who are responsible for the management of healthcare establishments that are testing and treating COVID-19 patients, quarantine facilities and local authorities are responsible for the proper management of the waste generated. Responsibilities of these establishments are as mentioned below:

#### Responsibilities of the Healthcare establishments

- The occupier has to inform MPCB and Common Treatment Facility (CTF) operator about the establishment and operations of the institute.
- BMW has to be segregated at source and labelled as COVID-19 with a BIOHAZARD symbol.
- Laboratory & microbiological waste, blood samples/bags etc. has to be pre-treated on-site and then sent to the CTFs for final disposal.
- BMW has to be stored at a safe, disinfected, ventilated and secured location.
- Liquid chemical waste has to be segregated at source and to be stored separately after neutralization.
- Liquid waste/sewage has to be treated with 2% Sodium Hypochlorite for 30 minutes.
- Training and immunization to be undertaken for all health care workers and others employees for Hepatitis B and Tetanus at the time of induction. Records of the same has to be maintained.
- All major accidents/COVID-19 infections have to be reported to MPCB.
- Report daily waste records on MPCB/CPCB web portal/ mobile app.
- Local MPCB office has to be reported immediately if CTF operator fails to collect/dispose off BMW within 24 hrs.
- Infection control committee to be established to review, monitor & record effectiveness of BMWM.

#### Roles and responsibilities of local authorities

- Ensure application for authorization is made by hospitals/institutions run by local authorities.
- Continue collection and transportation of segregated non-biomedical solid waste generated in hospitals and nursing homes.
- Provide suitable common disposal/incineration sites for biomedical waste generated in the municipal limits.
- Periodical interaction with medical associations, PCB, facility operator to be conducted to achieve better results.
- Evolve a mechanism to ensure that all the generators become members of a common facility.

#### Roles and responsibilities of person operating quarantine camps/homes

- Municipal solid waste (household waste) generated should be handed over to waste collector identified by the ULB and shall be disposed as solid waste as per provisions under SWM Rules, 2016
- Biomedical waste generated, if any, from quarantine centers/camps should be collected separately in yellow coloured bags provided by the ULB. Yellow bags should be handed over to authorized BMW waste collectors or be deposited at designated deposition centers established by ULBs.
- Persons operating quarantine camps/centers should call the Common Biomedical Waste Treatment Facility (CBWTF) operator to collect biomedical waste as and when it gets generated.
- Used masks and gloves generated from home quarantine or other households should be kept in paper bag for a minimum of 72 hours prior to disposal of the same as general waste. It is advisable to cut the masks prior to disposal to prevent reuse.

## **Precautions and safety measures**

Healthcare workers working at a COVID-19 facility or in close proximity to COVID-19 patients are at a high risk of getting infected by the virus. Hence they need to follow below stated appropriate hygiene procedure stated to protect themselves from getting infected by the COVID-19 virus.

For hand washing, workers have to make sure that they use the appropriate product and technique. Hands have to be washed for 40-60 seconds with soap and water. If water is not available, alcohol based hand sanitizer has to be used. The sanitizer has to be rubbed on hands for 20-30 seconds. During the line of work, if hands get visibly dirty or contaminated, they have to be washed under running water and antiseptic soap and dried with single use towel. Appropriate safety gear has to be used by the workers.

## **SOPs for healthcare workers**

Healthcare workers have to take precautions while handling medical equipment to prevent any kind of injury. Before removing equipment from patient's room it has to be cleaned and disinfected. While transporting used equipment, gloves have to be worn at all times. Safe handling of patient equipment should be strictly followed.

If there is spillage of chemical/s, the waste has to be attended immediately. The area where the spillage has taken place should be isolated, neutralized and cleaned thoroughly. The waste has to be collected separately for incineration. If there is body fluid spillage, the same procedure of isolation needs to be followed. The waste has to be cleaned with absorbent cloth or paper and disinfected appropriately. The waste has to be collected in separate liner for incineration.

The linen used by COVID-19 patients could have traces of the virus and hence if not handled in an appropriate method could become a cause of transmission of the virus. The laundry and surfaces used and touched by the patient have to be cleaned once a day and when the patient is discharged. The staff dealing with soiled bedding, towels and clothes from the patient should wear appropriate PPE. The soiled linen should never be carried against the body. It should be, at all times be carried in a leak-proof bag or bucket. Hand hygiene should be followed after blood/body fluid exposure and after PPE is removed. The discarded PPE and soiled linen should be placed in a clearly labeled, leak-proof bag or container for proper disposal. For cleaning of surfaces, established cleaning strategies are to be used. Surfaces can be divided into two categories, those with minimal hand contact (e.g. floors and ceilings) and those with frequent hand contact known as high touch surfaces. High touch surfaces in patient care areas like doorknobs, bed rails, light switches, toilet surfaces and privacy curtain should be cleaned and disinfected more frequently.

## **Biomedical waste categories**

Biomedical waste generated is categorized for segregation, collection, transportation and disposal. The biomedical waste is categorized in recyclable plastic waste, recyclable glass waste, metal strap waste and other hazardous waste demarcated by red, blue white and yellow colors respectively. The type of disposal procedure to be followed is based on the category and type of the biomedical waste generated.

## **Disposal of waste from quarantined homes and containment areas**

The Municipal Solid Waste (MSW) is categorized in three ways, i.e. hazardous, recyclable waste and biodegradable general waste which is demarcated as black, blue and green color respectively.

The facemasks, hand gloves and other protective equipment used by the citizens, health workers and laboratory personnel dealing with/from the quarantined households shall be collected separately in yellow plastic bags with a biohazard symbol and marked as "COVID-19 Waste". These yellow bags should be handed over to CBWTF operator after spraying disinfectant at the point of generation. The yellow waste bag shall further be collected and transported through a dedicated vehicle for treatment at CBWTF. The ULB officials and CBWTF operators shall maintain the records of handing over of the yellow waste bag/s. Further the CBWTF operator shall share the daily disposal records to MPCB on it's web portal.

The other municipal waste generated from quarantined homes/area will be collected in black bags after on-site disinfection. The on-site disinfected black waste bag shall be collected and transported through small closed vehicles to the designated municipal solid waste landfill site. The vehicles after unloading shall be sanitized thoroughly after every use. At the landfill site, such waste will be sprayed with Sodium Hypochlorite before burying in a trench of 2m x 1m x 1m (L x B x D). The trench should be covered with the same excavated material. The personnel handling yellow and black bags shall be provided with appropriate personal PPE and sufficient disinfectant at the point of generation as well as disposal.

# Training content

## 3.1. Biomedical Waste Management Rules, 2016

The following section explains the BMW Rules, 2016. These rules are promulgated by MoEF &CC, Govt. of India in suppression of Earlier BMW (Management & Handling) Rules, 1998. These rules are made under the provision of Environment (Protection) Act, 1986.

**Reference links:**

1. <http://mpcb.gov.in/>
2. [https://ueppcb.uk.gov.in/files/Pictorial-Guide-on-Biomedical-Waste-Management-Rules-2016-Amended-in-2018-2019\\_1.pdf](https://ueppcb.uk.gov.in/files/Pictorial-Guide-on-Biomedical-Waste-Management-Rules-2016-Amended-in-2018-2019_1.pdf)

## Biomedical Waste Management Rules, 2016

**Biomedical Waste** means **any waste**, which is generated during the **diagnosis, treatment or immunisation** of human beings or animals or **research activities** pertaining thereto or in the production or testing of biological or in health camps

### APPLICATION

1. The BMW Rules are applicable to a **person who has control over the institution and/or Health Care establishment**
2. It shall be the duty of every **occupier** of an institution who **generate, collect, receive, store, transport, treat, dispose, or handle** bio-medical waste in any form



Source: Maharashtra Pollution Control Board

Biomedical waste means any waste generated during the diagnosis, treatment or immunization of human beings / animals, in research activities or in production or testing of biological or in health camps. These rules are applicable to 'Occupier' i.e. Every person/institute who generates, stores, transports and /or treats and dispose the BMW generated. The 'Occupier' is legally bound to comply with these rules.

## Duty of Occupier Regarding COVID-19

1. **Inform establishment & Operation of Facility to SPCB & CTF operator**
2. Segregate BMW at source, Label as COVID-19 with BIOHAZARD symbol.
3. **Pre-treat of Laboratory & microbiological waste, blood samples/bags On-site then send to the CTFs for final disposal.**
4. Store BMW at safe, disinfected, ventilated and secured location
5. **Segregate liquid chemical waste at source and neutralization**
6. Treat liquid waste/sewage with 2% Sodium Hypochlorite for 30 min
7. **Provide training & Immunize all its HCW and others for Hepatitis B and Tetanus at the time of induction and maintain records**
8. Report to MPCB all major accidents/COVID infections to SPCB
9. **Report daily Waste records on SPCB/CPCB web portal/ Mobile app**
10. Inform the local SPCB office immediately if CTF operator fails to collect/dispose off BMW within 24 hrs.
11. **Establish Infection Control committee to review, monitor & record effectiveness of BMWM**

*Source: Maharashtra Pollution Control Board*

COVID-19 waste has to be handled as per provisions of BMW Rules, 2016, amended and as per specific guidelines of CPCB. It is crucial that the rules are followed to the core to avoid health hazards caused due to exposure to the waste.

## ROLE OF LOCAL AUTHORITY

1. Take initiative to establish common Biomedical Waste treatment facilities.
2. Ensure that applications for authorization are made by Hospitals/Institutions run by local authorities.
3. **Continue to pick up and transport segregated non-biomedical solid waste generated in hospitals and nursing homes,.**
4. Provide suitable common disposal/incineration sites for Biomedical Waste generated in municipal limits.
5. Periodical interaction with Medical Associations, PCB, facility operator for achieving better results.
6. To evolve a mechanism to ensure that all the generators become member of common facility

*Source: Maharashtra Pollution Control Board*

ULBs have to ensure a facility is provided for treatment & disposal of BMW or ensure HCEs join the common treatment facility within 75 km radius as per allocated jurisdiction to CTF.

## 3.2. SOPs for BMW Management

The following section illustrates SOPs for handling and disposal of biomedical waste.

### Precaution & Safety measures

#### Hand Hygiene (Use appropriate product and technique)

- Soap and water : Wash hands for 40–60 seconds!
- Alcohol based hand rub: When tap and running water is not available - Rub hands for 20–30 seconds!
- When hands are visibly dirty or contaminated with proteinaceous material, always use antiseptic soap, running water and single use towel

#### PPE according to the risk (Recommended PPEs used during COVID -19 Management)



Source: Maharashtra Pollution Control Board



For effective and safe handling of waste, handler must ensure use of recommended PPE and follow the hand hygiene protocol.

## Precaution & Safety measures

### Safe injection practices, sharps management and injury prevention

Wear gloves when handling and transporting used patient care equipment

### Safe handling, cleaning and disinfection of patient care equipment

Before removing equipment from patients room, medical equipment must be disinfected



#### CHEMICAL SPILLAGE

Isolate, neutralise and clean thoroughly

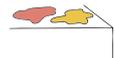
Collect in separate liner for incineration



#### BODY FLUID SPILLAGE

Isolate, mop with absorbent cloth/paper and disinfect appropriately

Collect in separate liner for incineration



### Cleaning soiled bedding, towels and clothes from

Clean laundry and surfaces in all environments at least once a day and when a patient is discharged

Staff dealing with soiled bedding, towels and clothes from patients should Wear appropriate

Never carry soiled linen against body; place soiled linen in a leak-proof bag or bucket. Perform hand hygiene on exposure to blood/body fluid and after removal of safety gear soiled linen should be placed in clearly labeled, leak-proof bags or containers



Source: Maharashtra Pollution Control Board

In addition to the use of PPE, it is essential to ensure disinfection and safe handling of all items to be used in the diagnosis and treatment of COVID-19 patients. Spills of chemicals and body fluids need to be managed following protocol. Linen /bedding must be handled and disinfected as per guidelines and soiled /unusable laundry should be disposed off as yellow waste.

## Precaution & Safety measures

### Environmental Cleaning and disinfection

#### Established cleaning strategies to be used

Remove the majority of bio-burden

Disinfect equipment and environmental surfaces

#### Housekeeping surfaces can be divided into two groups

Those with minimal hand contact (e.g. floors and ceilings)

“High touch surfaces” – those with frequent hand-contact

High touch housekeeping surfaces in patient-care areas should be cleaned and disinfected more frequently like:

**Doorknobs**

**Bedrails**

**Light switches**

**Wall areas around the toilet in the patient's room**

**Edges of privacy curtains, etc.**



Source: Maharashtra Pollution Control Board

Housekeeping surfaces are to be divided into high and low touch surfaces based on their usage. Surfaces likely to be in high contact, for example door handles, bed, electric switches, toilet walls etc. must be disinfected at regular intervals.

## Biomedical wastes categories Segregation, Collection, Treatment, Processing and Disposal options



Biomedical Waste is to be segregated in four colour coded bags/ containers as per the BMW, 2016. Waste generated needs to be segregated, collected, transported and disposed as per the categories.

## Segregation of MSW and BMW at COVID-19 HCEs



For Covid -19 common quarantine / home quarantine, general waste which has not been in contact with patients shall be treated as MSW following disinfection at source and at deep burial site. It has to be transported in a dedicated vehicle and records of the same should be maintained.

Biomedical waste i.e. masks and hand gloves from these areas (both patient/non patients) must be collected in yellow bag as BMW and should be handed over to authorised BMW CTF collection vehicle. Records of the same should be maintained. Biomedical waste from a COVID-19 ward must be collected and treated following BMW norms and should be disposed through BMW CTF operator only.

## Precaution for COVID-19 Isolation Wards

1. Use **dedicated trolleys** and separate colour coded bins/bags/containers
2. Ensure proper segregation of waste as per CPCB guidelines amended
3. Label **"COVID-19 Waste"** to be pasted on these items to enable CBWTFs to identify the waste easily for priority treatment and disposal immediately upon the receipt
4. Use **double layered bags** (using 2 bags) to ensure adequate strength and no -leaks
5. Collect and store biomedical waste separately prior to handing over the same CBWTF.
6. Biomedical waste collected in such isolation wards can also be delivered by HCW directly from ward into CBWTF collection van
7. **Maintain separate record** of waste generated from COVID-19 isolation wards
8. **General waste not in contact with COVID patients should be disposed as solid waste as per SWM Rules,2016**



Source: Maharashtra Pollution Control Board

COVID-19 waste should be handled while wearing appropriate PPE and with disinfection protocols for bins, trolley and waste transfer routes.

## Responsibilities of Person operating Quarantine Camps/Homes



1. **Less quantity of biomedical waste is expected** from Quarantine Camps/Quarantine Home/Home Care Facilities
2. **General solid waste** (household waste) generated should be handed over to waste collector identified by ULBs and shall be disposed as solid waste as per provisions under SWM Rules,2016
3. Biomedical waste at Quarantine Camps / Home-care **may also comprise** of used syringes, date expired or discarded medicines, used masks/gloves and in case of patients with other chronic diseases may also include drain bags, urine bags, bodyfluid or blood-soaked tissues/cotton, empty ampules etc.
4. Biomedical waste if any generated from quarantine centers/camps should be collected separately in **yellow colored bags** provided by ULBs Hand over yellow bags to authorized BMW waste collectors or Deposit yellow bags at designated deposition Centers established by ULBs.
5. Persons operating Quarantine camps/centers should call the **CBWTF operator** to collect biomedical waste as and when it gets generated
6. Persons taking care of quarantine home/Home-care should **deposit biomedical waste in yellow bag** if any generated from suspected or recovered COVID-19 patients, by following any of the methods as may be arranged by ULBs
7. **Used masks and gloves** generated from home quarantine or other households should be kept in paper bag for a minimum of 72 hours prior to disposal of the same as general waste. It is advisable to cut the masks prior to disposal to prevent reuse.

Source: Maharashtra Pollution Control Board

Responsibilities of person in-charge of quarantine centre, COVID-19 hospital include ensuring proper segregation of general and BMW waste and disposing the waste as per applicable in MSW and BMW rules.

## Disposal of waste from quarantined homes & containment areas

1. The **facemasks, hand gloves and other protective equipment** used by the citizens, health workers, laboratory personnel dealing with/from the quarantined households shall be collected separately in **yellow plastic bags with biohazard symbol and marked as "COVID-19 Waste"**
  2. The Yellow bags will be handed over to the Biomedical Waste Common Treatment Facility (CTF) operator after spraying disinfectant at the point of generation
  3. The Yellow bag waste shall be collected and **transported through dedicated vehicle** for treatment at CTF
  4. The officer in charge of urban local body and CTF shall **maintain the records** of handing over of such Yellow bag waste and **CTF operator shall share the disposal records on daily basis to MPCB web portal**
5. The **other Municipal Waste** generated from quarantined homes/area will be collected in '**Black' bags** after on-site disinfection
  6. The **on-site disinfected 'Black' bag** waste shall be collected and transported through small closed vehicles to the designated Municipal Solid Waste landfill site. The **vehicles** after unloading shall be sanitized thoroughly after every use.
  7. At the landfill site, such waste will be **sprayed with Sodium Hypochlorite** and same shall be buried deep in a trench of 2mx1mx1m (L xBxD) and same shall be covered with the same excavated material.
  8. The personnel handling Yellow and Black bags **shall be provided with personal protectives and sufficient disinfectant at both the point of generation and disposal**



Source: Maharashtra Pollution Control Board

Household Waste which has not been in contact with COVID- 19 patient shall be treated as MSW following disinfection at source and at deep burial site. Biomedical waste i.e. Masks and hand gloves from these areas (both patient/non patients) must be collected in yellow bags as BMW and handed over to authorised BMW CTF collection vehicles and records for the same should be maintained. BMW waste from COVID-19 ward must be collected and treated following BMW segregation and disposed through BMW CTF operator only.

## Cleaning soiled bedding, towels and clothes from patients



### Clean laundry and surfaces in all environments at least once a day and when a patient is discharged with hospital disinfectants:

70% ethyl alcohol for reusable dedicated equipment

Sodium hypochlorite at 0.5% ( 5000 ppm) for surface disinfection

Staff dealing with soiled bedding, towels and clothes from patients should Wear appropriate PPE ( heavy duty gloves, mask, eye protection (goggles/face shield), long-sleeved gown, apron (if gown is not fluid resistant), and boots/closed shoes

Never carry soiled linen against body; place soiled linen in a leak-proof bag or bucket Perform hand hygiene after blood/body fluid exposure and after PPE removal Soiled linen should be placed in clearly labelled, leak-proof bags or containers

**Washing machine:** Wash at 60-90°C with laundry detergent followed by soaking in 0.1% chlorine for approximately 30 minutes and dried

**Non machine washing:** Soaked in hot water with soap/detergent in a large drum Use a stick to stir and avoid splashing

Empty the drum and soak linen in 0.1% chlorine for approx. 30 minutes  
Rinse with clean water and let linens dry fully in the sunlight

Source: Maharashtra Pollution Control Board

**Disinfection of Linen /Laundry:** Disposable linen should preferably be used for COVID-19 patients. Soiled linen must be disposed in yellow bags. Linen should not be collected against body even while using PPE. Trolleys should be used to handle the same. Non soiled linens must be washed in washing machine at 60-90-degree Celsius water temperature followed by detergent and 0.1% chlorine. For manual wash, the linen should be immersed in hot soapy water for 30 min and dried in sunlight after rinsing with clean water.

### 3.3. BMWM Service Chain

The following session talks about the biomedical waste management service chain and precautions and preventive measures to be taken at each level.

### Bio-Medical Waste Transportation & Disposal by CTFs

Biomedical waste is to be given to the Common Biomedical Waste Treatment and Disposal Facility (CBWTF) for complete treatment and disposal as per Biomedical Waste Management Rules, 2016

**Standards for Treatment and Transportation of Biomedical Waste are as per Schedule II of BMWM Rules, 2016**

\*Only if no CBWTF within 75km. If unable to set up CTF, can use CBWTF up to 150 km if Waste can be transported in 48hrs

Colour	Disposal Options
Blue	Disinfection or Auto/Micro/Hydro and sent to recycling
White	Auto/Dry heat sterilization followed by shredding/ mutilation/encapsulation
Red	Auto/Micro/Hydro and sent to recycling
Yellow	Incineration (Deep Burial only in rural or remote areas without access to CBWTF with prior approval)

Source: R&D: Ananya Tewari, Poornima Prabhakaran and Shyamala Mani, Centre for Chronic Disease Control and Centre for Environmental Health, Public Health Foundation of India

Biomedical waste segregated in colour coded bags/containers and appropriately labelled should handed over to the dedicated BMW CTF transport vehicle. Records of the same should be maintained. Yellow waste should be disposed by incineration designed for the BMW and ash generated is to be sent to landfill. Red waste should be disposed by autoclaving/ microwaving complying with standards of disinfection followed by mutilation sent to authorised plastic waste recyclers. Blue and white waste is to be treated with chemical treatment/ autoclaving and sent to recyclers authorised after mutilation.



## Government Guidelines & Advisories on BMWM

### Rules and Guidelines applicable

1. **MoEF&CC:** Bio-Medical Waste Management Rules 2016 as amended
2. **CPCB:** Guidelines for Management of Healthcare Waste as per Biomedical Waste Management Rules, 2016
3. **CPCB:** CPCB issued guidelines for waste generated during Treatment/diagnosis/Quarantine of COVID-19 suspected/confirmed Patient on 18th March 2020, Revised on 25 Mar 2020 and 18th April 2020
4. **CPCB** Guidelines for Handling, Treatment and Disposal of Waste Generated during Treatment/Diagnosis/Quarantine of COVID-19 Patients – Revision 2 dated 18/04/2020
5. **CDC:** Manual for BMW Mgmt. – Hospital Administrator, Doctors and Nurses (HCW), Waste Handlers
6. **SBM MHUA: COVID -19:** Additional advisory for maintaining cleanliness during lockdown period

Source: Maharashtra Pollution Control Board

The listed agencies in the slide have released specific guidelines for BMWM and specifically COVID-19 waste managements.

## Government Guidelines & Advisories on BMWM

### Rules and Guidelines applicable

7. **MPCB:** Guidelines for Management of Bio-Medical Waste Contaminated / Suspected to be Contaminated with COVID-19 dated. 20.03.2020
  1. Guidelines for Bio Medical Waste Treatment facilities
  2. Guidelines for Healthcare Establishment and Pathology / R&D Laboratories handling COVID-19 cases
  3. Guidelines for HCEs not handling COVID-19 cases and General Public / Large Establishments (Airports, Railway Stations, Bus stands, Malls, Theatres, Banquet Halls, Industries, IT Centre etc.)
  4. Guidelines for Self-Quarantined COVID-19 suspects
8. **MPCB:** Guidelines for collection, transportation and disposal of suspected COVID-19 waste and solid waste from quarantined homes and containment areas on 4th April 2020
9. **CDC:** Guidelines for Quarantine facilities COVID-19 dated 20/03/2020 & 4/04/2020
10. **AIIMS Rishikesh:** Infection Prevention & Control Policy For COVID-19

Source: Maharashtra Pollution Control Board

The listed agencies in the slide have released specific guidelines for biomedical waste management and specifically COVID-19 waste managements.

## Reporting of Biomedical Waste Management

- All generators, handlers and treatment operators should be aware about COVID-19 biomedical waste generation, collection, treatment and disposal.
- For this information, CPCB has developed a mobile application named COVID19BMW
- This **mobile application is only made for COVID-19 Biomedical Waste**
- Data has to be uploaded in this app everyday
- SPCB can review if there are any gaps/lacunae in the reports

COVID-19 waste generation and disposal must be reported on daily basis by all stake holders, hospitals, ULBs, BMW CTFs and SPCB. CPCB has developed a mobile application for the same. Data has to be uploaded on this app to maintain daily records.

## Reporting of Biomedical Waste Management

### Step 1:

#### REGISTRATION (Generators & Waste Handlers)

1. CBWTF to register all Waste Handler and Facility
2. SPCB shall ensure that all HCF, quarantine centre, or home care register them on this app

### Step 2: Waste Tracking

#### GENERATORS

1. Enter Waste Data
2. Handover Waste

#### Waste Handler (CBWTF vehicle)

1. Reach each generator location
2. Review and Accept waste Data

#### CBWTF

1. Review and Accept Waste from Waste Handler
2. Submit Data to SPCB

### Step 3: Verification and Approval

#### SPCB

1. Verify Waste Data for Previous Data and Approve

The above slide show steps involved in reporting of COVID-19 waste in CPCB app.

### 3.5. Good Practices for BMW (UNIDO Video)

---

1. [https://drive.google.com/file/d/1eo8nfW5CW00ctS45B\\_joYx\\_ntcxln1iF/view](https://drive.google.com/file/d/1eo8nfW5CW00ctS45B_joYx_ntcxln1iF/view)
2. <https://www.youtube.com/watch?v=7VTp7Fc2UN8&feature=youtu.be>

The session concludes with showcasing a video developed by United Nations Industrial Development Organization (UNIDO) to the participants on safe practices in biomedical waste management.

### References

- Public Health Foundation of India (2020), *Pictorial guide on Biomedical Waste Management Rules 2016*.  
<https://phfi.org/covid19/covid-resources/>
- Central Pollution Control Board (April 2020), *Guidelines for Handling, Treatment and Disposal of Waste Generated during Treatment/Diagnosis/ Quarantine of COVID-19 Patients*.  
<http://www.mppcb.mp.gov.in/proc/BMW/18-4-2020-CPCB-Gidelines-for-disposalofCOVID-19.pdf>
- Maharashtra Pollution Control Board (March 2020), *Guidelines for Management of Bio-Medical Waste Contaminated / Suspected to be Contaminated with COVID-19*.  
[https://www.mpcb.gov.in/sites/default/files/MPCB\\_guidelines\\_25032020.pdf](https://www.mpcb.gov.in/sites/default/files/MPCB_guidelines_25032020.pdf)
- National Centre for Disease Control (2020), *Guidelines for Quarantine facilities COVID-19*.  
<https://www.mohfw.gov.in/pdf/90542653311584546120quartineguidelines.pdf>



# Conclusion and way forward



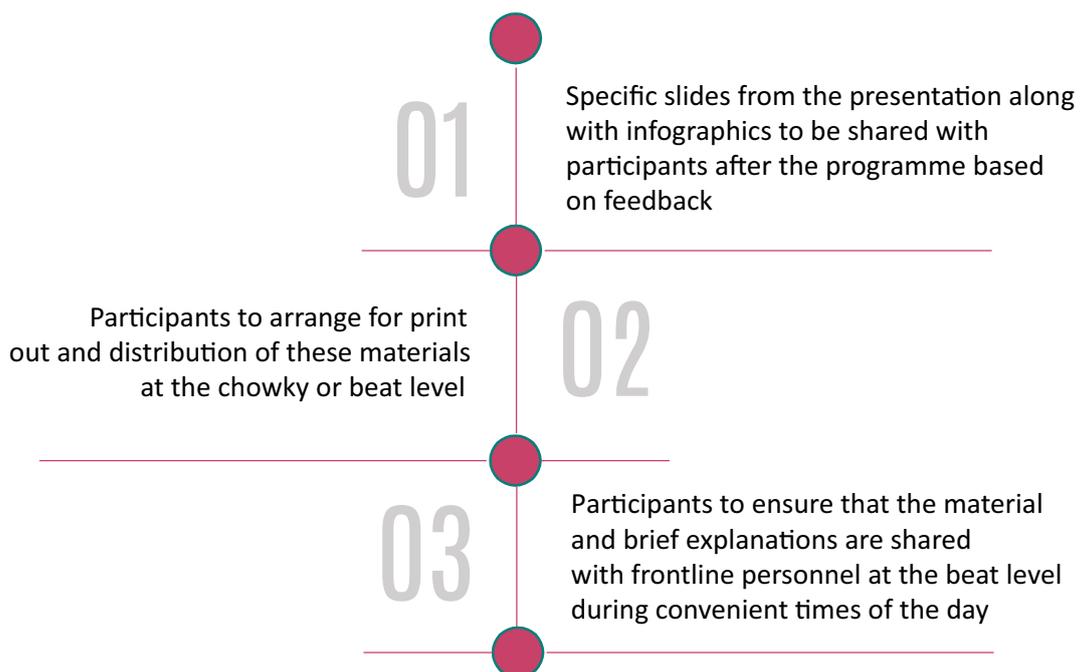


## Conclusion and way forward

### Strategy for roll out of the module to subsequent level

To date, a large number of population has been affected by COVID-19 and governments all around the world are struggling to cope with and address the immediate challenges due to this pandemic. This module has been developed as a ToT module for ULB officials/decision makers involved in sanitation and waste management in the wake of COVID-19. The module is kept precise, given that the officials are actively engaged and deployed in their demanding jobs in this situation. After the training, the officials/participants are expected to further disseminate this information to the other relevant staff of their respective ULBs and the frontline sanitation workers working on field to provide essential sanitation and waste management services in this situation.

Following strategy can be followed for rolling out the training to the next level:



## Links of important web pages

As the situation is rapidly evolving, officials and staff are expected to regularly keep themselves updated with guidelines, advisories, circulars etc. which are regularly published on the following websites:

- **World Health Organization, India**  
[https://www.who.int/india/emergencies/coronavirus-disease-\(covid-19\)](https://www.who.int/india/emergencies/coronavirus-disease-(covid-19))
- **Ministry of Housing and Urban Affairs, Government of India**  
<https://mohua.gov.in/>
- **Ministry of Health and Family Welfare, Government of India**  
<https://www.mohfw.gov.in/>
- **Central Pollution Control Board**  
<http://www.cpcb.nic.in/>
- **Indian Council for Medical Research**  
<https://www.icmr.gov.in/ctechdocad.html>
- **Maharashtra Pollution Control Board**  
<http://mpcb.gov.in/>
- **Public Health Department, Government of Maharashtra**  
<https://arogya.maharashtra.gov.in/Site/Home/Index.aspx>

## Response from ULBs of Maharashtra on trainings conducted based on this module

Feedback from participants was very positive, with the four sessions recording 1200+ participants. The feedback indicated that participants felt the modules were effectively covered, most relevant issues were addressed, and they would be able to effectively pass their training to the frontline health and sanitation workers. FAQs from the participants were also listed and answered post the trainings.

## Conclusion and way forward

The training has been developed with the flexibility to allow for suitable alterations as deemed necessary in response to the emerging learning needs of the participants. The conducting state/agency can modify the content to make it more state specific so as to make the material and handouts more relevant and relatable to the participants. The training agency can use any suitable online platform to conduct the trainings. On-field experiences of subject experts would be most valuable while explaining concepts to the participants. In view of the challenges posed by the virus described in the document, good dialogue with the participants through active engagement in the QA session will further help in adding significance to the training.

The COVID-19 crisis has put the resilience of our people to the test. During such time, updating the ULB officials and relevant decision makers with adequate information is crucial. Thus, this ToT module aims to help disseminate information related to environment sanitation and waste management and benefit the officials in response and preparedness to the circumstances in a better manner.

## Partners and Resource Organizations

### Partner Organizations

---

#### Maharashtra Pollution Control Board

- Dr. Amar Supate, Principal Scientific Officer, MPCB
- Mr. Chetan Sawant, Jr. Sci. Asst., MPCB

#### All India Institute of Local Self Government, Mumbai

- Mr. Ajit Kumar Jain, IAS (Retd.), Director, Centre for Sustainable Governance, AIILSG Mumbai
- Ms. Utkarsha Kavadi, Director, Regional Centre for Urban and Environmental Studies, AIILSG Mumbai
- Ms. Shweta Nagarkar, Research Associate, RCUES, AIILSG Mumbai
- Ms. Amruta Paranjape, Research Associate, RCUES, AIILSG Mumbai
- Mr. Rudreshwar Malkani, Research Associate, CSG, AIILSG Mumbai
- Mr. Akash Gaikwad, Research Associate, CSG, AIILSG Mumbai
- Mr. Shailesh Chalke, Programme Assistant, RCUES, AIILSG Mumbai

#### United Nations Children’s Fund, Field Office for Mumbai

- Mr. Yusuf Kabir, WASH Specialist and Emergency and DRR Focal Point, UNICEF Maharashtra
- Mr. Anand Ghodke, WASH Officer, UNICEF Maharashtra
- Ms. Aparna Kulkarni, State Communication Consultant for WASH and Menstrual Hygiene Management, UNICEF Maharashtra
- Mr. Jayant Deshpande, State Sanitation Consultant, UNICEF Maharashtra

### Initiative Supported by

---

#### Urban Development Department, Government of Maharashtra

- Ms. Seema Dhamdhere, Executive Director, Maharashtra Urban Development Mission (MUDM), UDD, GoM
- Mr. Jayant Dandegaonkar, State Mission Director, Swachh Maharashtra Mission (Urban), UDD, GoM

### Other Panel Members/ Resource Organizations

#### Public Health Aspects of COVID-19

- Dr. Vivek Pardeshi, Surveillance Medical Officer, World Health Organization, Mumbai
- Dr. Deepak Raut, Director, National Institute of Public Health Training & Research, MoHFW
- Dr. Sanjay Pattiwar, Tata Trust

#### WASH – Precautions, Preventive Measures and Good Practices

- Dr. Ajit Salvi, Executive Engineer, Municipal Corporation of Greater Mumbai
- Ms. Seema Redkar, Tata Trust
- Dr. Pawan Kumar Labhasetwar, Sr. Principal Scientist, National Environmental Engineering Research Institute

#### Biomedical Waste Management

- Dr. Malini Capoor, Professor, VMMC and Safdarjang Hospital, Delhi
- Mr. Pundlik Awate, Former Chief Engineer, SWM, Municipal Corporation of Greater Mumbai
- Ms. Youthika Sci. C, Central Pollution Control Board, Delhi



**All India Institute of Local Self-Government, Mumbai with  
 United Nations Children’s Fund, Mumbai  
 Maharashtra Pollution Control Board  
 in collaboration with  
 Urban Development Department, Government of Maharashtra**

