Over View of COVID 19

Virology-

- •SARS-CoV-2 is a β-coronavirus.
- •Coronaviruses(CoV) are divided into four genera, including α−/β−/γ−/δ-CoV.
- •α-and β-CoVare able to infect mammals, while γ-and δ-CoVtend to infect birds.
- •αCoVcause mild respiratory infection in humans
- •Other two known β-CoVsare SARS-CoVand MERS-CoVcause severe and potentially fatal respiratory tract infections .

Modes of transmission

- Droplet transmisson -YES
- Fomites -YES
- Airborne transmission Possible in specific circumstances eg; intubation, bronchoscopy, open suctioning
- Fecal transmission -No evidence
- Verticaltransmission -No evidence
- Blood transfusion -Not reported

Aerosol, surface, temperature stability of SARS COV2

- Aerosols -3hours
- Plastic -72hours
- Stainless steel -72 hours
- Copper -4 hours
- Cardboard -24hours
- Surgical mask material -7 days
- 4 degrees C -14 days
- 70 degrees C -Inactivated after 5min
- Household bleach, 70% ethanol -No virus detected after 5min

Transmission dynamics

- Stage I –Imported cases only Indicates cases have been acquired outside the location of reporting.
- Stage II -Local transmission The virus spreads locally, through an individual who either has a travel history, or the one who has come in direct contact with an already infected person.
- Stage III -Community transmission Inability to relate confirmed cases through chains of transmission for a large number of cases, or by increasing positive tests through sentinel samples (routine systematic testing of respiratory samples from established laboratories).
- StageIV -Widespread outbreak Epidemic—as the number of cases and deaths begin rapidly multiplying, with no end in sight.

Incubation period

- Incubation period for COVID-19 range from 1-14 days, mean is 5 days.
- •A case with an incubation period of **27 days** has been reported by Hubei Province.
- •A case with an incubation period of **19 days** was observed in a JAMA study of 5 cases
- •Outliers reflects ?second exposure.

Symptoms and signs

	No. (%)			
	Total (N = 138)	ICU (n = 36)	Non-ICU (n = 102)	*P* Value[a]
Signs and symptoms				
Fever	136 (98.6)	36 (100)	100 (98.0)	>.99
Fatigue	96 (69.6)	29 (80.6)	67 (65.7)	.10
Dry cough	82 (59.4)	21 (58.3)	61 (59.8)	.88
Anorexia	55 (39.9)	24 (66.7)	31 (30.4)	<.001
Myalgia	48 (34.8)	12 (33.3)	36 (35.3)	.83
Dyspnea	43 (31.2)	23 (63.9)	20 (19.6)	<.001
Expectoration	37 (26.8)	8 (22.2)	29 (28.4)	.35
Pharyngalgia	24 (17.4)	12 (33.3)	12 (11.8)	.003
Diarrhea	14 (10.1)	6 (16.7)	8 (7.8)	.20
Nausea	14 (10.1)	4 (11.1)	10 (9.8)	>.99
Dizziness	13 (9.4)	8 (22.2)	5 (4.9)	.007
Headache	9 (6.5)	3 (8.3)	6 (5.9)	.70
Vomiting	5 (3.6)	3 (8.3)	2 (2.0)	.13
Abdominal pain	3 (2.2)	3 (8.3)	0 (0)	.02
Onset of symptom to, median (IQR), d				
Hospital admission	7.0 (4.0-8.0)	8.0 (4.5-10.0)	6.0 (3.0-7.0)	.009
Dyspnea	5.0 (1.0-10.0)	6.5 (3.0-10.8)	2.5 (0.0-7.3)	.02
ARDS	8.0 (6.0-12.0)	8.0 (6.0-12.0)	8.0 (6.3-11.3)	.97

Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus–Infected

Groups with elevated risk

Risk factors for critical illness

Elderly people above 70 years of age, and

People with underlying conditions such as hypertension, diabetes, cardiovascular disease, chronic respiratory disease, immune compromised status, cancer and

Obesity (Europe :73.4% of critically ill patients with BMI 30-40+).

Duration of illness

- ▪**Mild cases**: approximately **2 weeks**
- ▪**severe or critical**disease:**3 -6 weeks**
- ▪Time from onset of symptoms to the development of severe disease (including hypoxia):**1 week**
- ▪Patients who have died, the time from symptom onset to outcome ranges from 2 -8 weeks.

Groups with elevated risk

Risk factors for critical illness-

- Elderly people above 70 years of age, and
- People with underlying conditions such as hypertension, diabetes, cardiovascular disease, chronic respiratory disease, immune compromised status, cancer and
- Obesity (Europe :73.4% of critically ill patients with BMI 30-40+).

Pregnant women and children

- •Atypical findings such as leucocytosis and higher prevalence of consolidation lesions in CT images.
- •Do not aggravate the severity and maternal outcomes of COVID-19 pneumonia.
- •Study on 30 neonates delivered by COVID-19 rtRT-PCR positive women showed no SARS-CoV-2 infection on the neonates.
- •Children made up a very small proportion age <10 years (1.1%), 10–19 years (2.5%)

Diagnosis

WHO case definition

- **Probable case**
- A. A suspect case for whom testing for the COVID-19 virus is inconclusive. a. Inconclusive being the result of the test reported by the laboratory or
- B. A suspect case for whom testing could not be performed for any reason.
- **Confirmed case**
- A person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms.

Suspect case

- A> A patient with acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath), AND a history of travel to or residence in a location reporting community transmission of COVID-19 disease during the 14 days prior to symptom onset. **OR**
- B> A patient with any acute respiratory illness AND having been in contact with a confirmed or probable COVID-19 case (see definition of contact) in the last 14 days prior to symptom onset;
- C > A patient with severe acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath; AND requiring hospitalization) AND in the absence of an alternative diagnosis that fully explains the clinical presentation

Definition of contact

- A contact is a person who experienced any one of the following exposures during the 2 days before and the 14 days after the onset of symptoms of a probable or confirmed case:
- 1. Face-to-face contact with a probable or confirmed case within 1 meter and for more than 15 minutes;
- 2. Direct physical contact with a probable or confirmed case;
- 3. Direct care for a patient with probable or confirmed COVID-19 disease without using proper personal protective equipment1; OR
- 4. Other situations as indicated by local risk assessments.

Note: for confirmed asymptomatic cases, the period of contact is measured as the 2 days before through the 14 days *after the date on which the sample was taken which led to confirmation.*

Diagnostic tests

TESTS FOR VIRAL RNA	Serological tests
Identify viral RNA through nucleic acid amplification, usually using PCR.	Detect IgM, IgA, IgG, or total antibodies against S protein
Sample types being tested are swabs taken from the nasopharynx and/or or pharynx.	Typically blood.
Nasopharyngeal swab(63%) more sensitive than the oropharyngeal(32%).	Less sensitivity and specific
Costly and available	Cheap and no yet widely available
Results take hours to days.	Results displayed with in minutes
Postive in presymptomatic and early couse of infection	Antibody response to infection is host dependent and take time between 7 and 11 days postexposure
Best test in setting of acute illness	Not useful in the setting of an acute illness..
Accuracy of the test is affected by the quality of the sample(proper sample collection method required)	Accuracy is less effected by method of sample collection.

Patel R et al . Report from the American Society for Microbiology COVID-19 International Summit, 23 March 2020: Value of Diagnostic Testing for SARS–CoV-2/COVID-19.

RT PCR

- A negative test does not negate the possibility that an individual is infected
- Sputum or bronchoalveolar lavage should be used for collecting lower respiratory tract specimens as they yielded highest viral loads .
- Viral RNA does not equate to live virus, detection of RNA does not mean that the virus can be transmitted from that patient
- Useful for individual patient management, for implementation of mitigation strategies to prevent spread in health care facilities and in the community
- Two sequential tests done over 24hours should be negative for cure of COVD19 infection

SEROLOGY

Antibody tests may facilitate

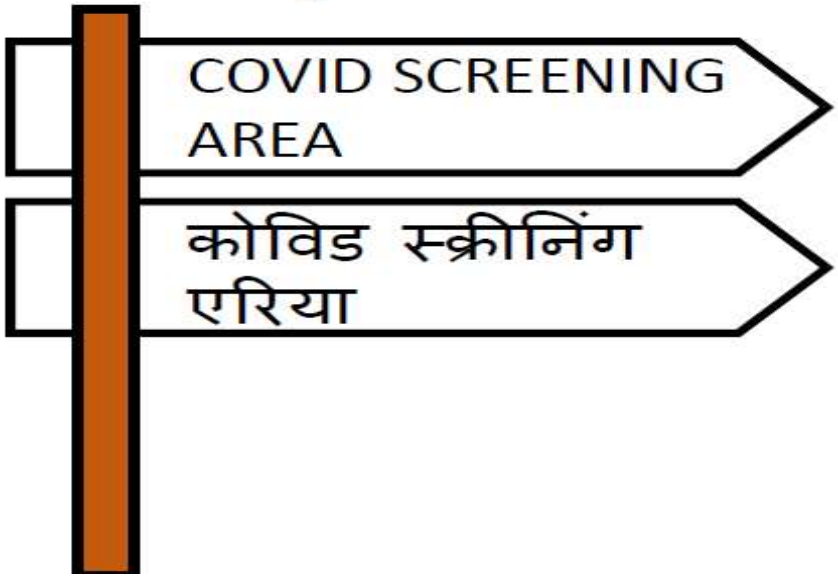
- 1)Contact tracing
- 2)Serologic surveillance at the local, regional, state, and national levels
- 3)Identification of those who have already had the virus and thus may (if there is protective immunity) be immune.
- 4)Used to guide return-to-work decisions (e.g., healthcare workers).
- 5)Useful to identify individuals for therapeutic or prophylactic neutralizing antibodies.
- 6)Serologic testing can possibly be used diagnostically to test viral RNA-negative individuals presenting late in their illness.

Current testing strategy in India

- 1)All symptomatic individuals who have undertaken international travel in the last 14 days:
- 2)All symptomatic contacts of laboratory confirmed cases.
- 3)All symptomatic health care workers.
- 4)All hospitalized patients with Severe Acute Respiratory Illness (fever AND cough and/or shortness of breath).
- 5)Asymptomatic direct and high-risk contacts of a confirmed case should be tested once between day 5 and day 14 of coming in his/her contact.

Protocol for emergency and trauma cases with special reference to COVID-19

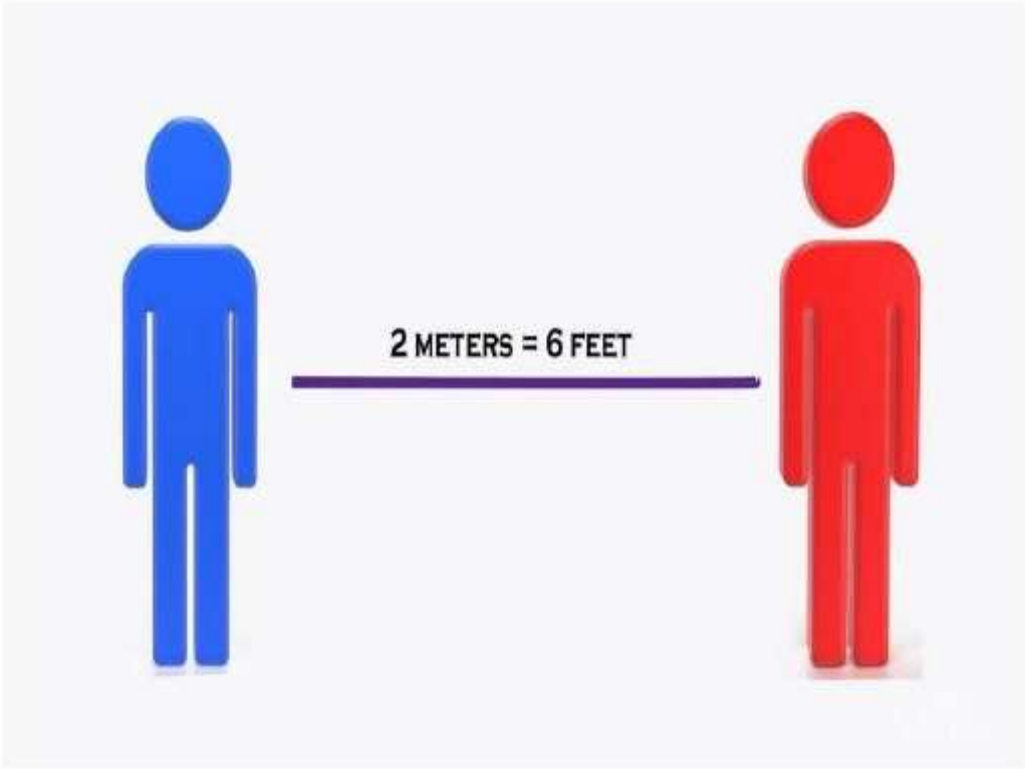
Screening area should be separate and should have a large sign board in Hindi and English, area should be enough to inquire emergency patients with social distancing.



Screening of all subjects must be done under strict precautions like →

- 1.Social distancing
- 2.Protection of medical and paramedical staff with triple layer mask with proper distancing of 1-2 meters.
- 3.Proper hand sanitation, disinfection and environmental hygiene.
- 4.Screening personnel should sit in a glass cabin or a room with one wall with perforation or with microphone for communication with the patients.
- 5.Screening cabin should be placed at entry, and preferably in open area or the screening room should be such that one window opens outside or the room is located close to the entrance.

Social Distancing



If N95 mask is not available, triple layer mask is sufficient

A. Screen for

1. Fever - using handgun & infrared thermometer
2. International travel within 28 days
3. Contact with COVID-19 positive person/from hotspot* area/ large migration gathering/evacuee centre
4. Participation and/or contact with Tabliqi Jamaat within a month
5. All suspected health care workers.
6. Screen for SARI (Fever, cough, breathlessness for less than 10 days)
7. Antibody testing for COVID-19 (if available).

*List of hotspot areas should be at this screening area

Such format should be tagged to the case sheet of the patient

 or 

Name: Sex: Address:	Age: ID: Mobile No.:	
Tag Green: ☐	Red: ☐	**(Yes/No)**
Fever?		
International travel within 28 days?		
Contact with COVID-19 positive person/from hotspot area/ large migration gathering/evacuee centre?		
Participation and/or contact with Tabliqi Jamaat within a month?		
All suspected health care workers.		
Screen for SARI?		
Antibody testing for COVID-19?		

B. Team at Screening Area

1. Causality Medical Officer
2. 1 senior/junior resident
3. Staff nurse
4. Ward boy
5. Bio-medical waste personnel
6. Volunteer to guide the patient

Note: Training of all medical and paramedical staff is mandatory.

- All the medical and paramedical staff should ensure full safety protocol as they must use triple layer surgical mask and keep at least 1 to 2m distance between suspected patients and other patients.
- •All the patients in this area must wear a mask.
- •Care of hand sanitization must be taken care of.
- •Care and sanitation of environments hould also be taken care of.

C. Any suspicious patient will be tagged as RED and others as GREEN

Suspected

Others

RED Tag

- Fulfilling any one (or more) of the points for screening

A. Screen for

1. Fever - using handgun & infrared thermometer
2. International travel within 28 days
3. Contact with COVID-19 positive person/from hotspot* area/ large migration gathering/evacuee centre
4. Participation and/or contact with Tabliqi Jamaat within a month
5. All suspected health care workers.
6. Screen for SARI (Fever, cough, breathlessness for less than 10 days)
7. Antibody testing for COVID-19(if available).

*List of hotspot areas should be at this screening area

Green Tag

- Not fulfilling any one of the points for screening

A. Screen for

1. Fever - using handgun & infrared thermometer
2. International travel within 28 days
3. Contact with COVID-19 positive person/from hotspot* area/ large migration gathering/evacuee centre
4. Participation and/or contact with Tabliqi Jamaat within a month
5. All suspected health care workers.
6. Screen for SARI (Fever, cough, breathlessness for less than 10 days)
7. Antibody testing for COVID-19(if available).

*List of hotspot areas should be at this screening area

Green Tag patients

Treat as usual, non-COVID emergency

Red Tag patients

These patients should be shifted with full precautions to:

1. **Suspected Isolation Ward, or**
2. **TRIAGE management ward**

Red tag patients will be kept in these wards till the nasal/throat swab report for COVID-19 comes out to be positive or negative. It will take 12-24 hours.

These wards should have preferably separate chambers/rooms with separate toilets. If separate rooms are not available, patients should be kept at least 2m apart from each other.

Red Tag patients

Suspected Isolation ward or TRIAGE management ward

In this ward, nasal and throat swab of all the patients should be taken in viral transport medium (VTM) and transported on ice(cool chain) for COVID-19 by trained healthcare professional with appropriate PPE with gloves; maintaining infection control when collecting the samples and proper disposal of all waste generated.

Red Tag patients after 12-24 hours

- If report is negative, treat as non-COVID patients

- If report is **positive**, i.e. COVID +ve, they should be treated in either of the following according to the diagnosis:
  a) Medical isolation ward
  b) Dedicated COVID +ve OT
  c) Dedicated COVID +ve CATH lab

Protocol for medical and paramedical staff at RED tag zone

- All the medical and paramedical staff should ensure full safety protocol.
- Full team of treating patients will be on active quarantine and passive quarantine.
- All the areas should follow the strict protocol for safety and sanitation and disinfection.

Training of all medical and paramedical staff is mandatory.

Protocol for medical and paramedical staff at RED tag zone: SAFETY

- Strict protocol of safety for medical and paramedical staff and protocol for sanitation and disinfection is applicable to all places according to guidelines.

- Infection prevention control is a critical and integral part of managing such patients starts from point of entry and standard precautions including hand hygiene, use of PPE & N-95 masks and avoiding direct contact with the patients and patients body fluids and secretion should be practiced. Droplet precautions should also be taken care of.

Protocol for medical and paramedical staff at RED tag zone: SAFETY

- Dedicated equipment like stethoscopes, Infrared/handgun thermometers and BP instrument should be used.

- Standard precautions must also include prevention of injury, safe waste management, cleaning and disinfection of equipment.

- Environmental cleaning is a part of precaution and ensure disinfection procedure consistently and correctly.

- Bio-medical Waste Management: All PPEs, face masks and gloves worn during sampling to be incinerated (yellow bin). Rest of all plastics should be autoclaved (red bin)
- Separate Laundry facility should be available.
- Wherever possible disposable sheet should be used.
- Laundry of active quarantined to be soaked in 0.5% hypochlorite for 30 minutes followed by wash by hot water. (70^{o}C)

D. Departments like cardiology, Gynecology & Obstetrics, radiotherapy, and dialysis units should follow the same protocol for staff, sanitation, disinfection and protection.

- Cardiology department
  1. Should have dedicated and fully equipped ward with separate entry/exit.
  2. Dedicated CATH lab for COVID positive patients to be earmarked.
- Gynaecology & obstetrics
  1. Should have dedicated and fully equipped ward with separate entry/exit.
  2. Dedicated COVID positive OT and labour room to be earmarked.

- Radiotherapy
  1. Should have dedicated and fully equipped ward with separate entry/exit.
- Dialysis Unit
  1. Should have dedicated and fully equipped ward with separate entry/exit.
  2. Dedicated dialysis machine for the patients.
  3. All COVID positive precautions must be strictly followed and all staff members should be monitored for COVID-19 infection.
  4. Doctors, technicians, nursing staff, inserting lines in such patients should wear PPE. Rest of all staff can maintain a safe distance with standard precautions

- All departments should have round the clock services with trained paramedical and medical staff.

- All dedicated OTs/Cath Labs/wards/labour rooms should have separate donning and doffing rooms.

2019-NOVEL CORONAVIRUS (COVID-19) SPECIMEN COLLECTION KIT INSTRUCTIONS

- **Use:** To collect nasopharyngeal specimens for 2019-Novel Coronavirus (SARS-CoV-2), the virus that causes COVID-19.
- **Kit contents:** 1 Tube of Universal Transport Media (UTM)
- 1 Nasopharyngeal swab (smaller swab, flexible shaft) **(CDC recommended)**
- 1 Ziploc specimen bag containing absorbent pad
- 1 RI State Health Laboratories Test Requisition form
- 1 Ice pack (keep in a freezer until ready to package & transport specimens)

- **Collection Instructions**:
- See the current CDC guidelines for upper and lower respiratory specimen collection and appropriate biosafety precautions for healthcare workers found at:

→ https://www.cdc.gov/coronavirus/2019-nCoV/guidelines-clinical-specimens.html

→https://www.cdc.gov/coronavirus/2019-ncov/hcp/caring-for-patients.html

- • Label tube of UTM legibly with the patient's name **and** date of birth, or medical record number (specimen tube **must** have two unique patient identifiers on it, or it will not be tested).

Nasopharyngeal specimen: (CDC recommended specimen type)

- • Use the flexible shaft NP swab provided to collect the specimen.
- • Have the patient blow their nose and then check for obstructions.
- • Tilt the patient’s head back 70 degrees & insert the swab into nostril parallel to the palate (not upwards) until resistance is encountered or the distance is equivalent to that from nostrils to outer opening of patient’s ear indicating contact with nasopharynx. Leave swab in place for several seconds to absorb secretions. Slowly remove the swab while rotating it.

- • Insert the swab into the tube of UTM, making certain that the swab tip is covered by the liquid in the tube. The swab is to remain in the tube for transport ➢ **Plastic shaft NP swab**: The swab shaft extends past the top of the tube. Snap off at the break line on the shaft, allowing the end with the swab tip to remain in the liquid. The tip of the swab must be immersed in the liquid.
- ➢ **Wire shaft swab:** cut the upper end of the wire with clean scissors so that it is even or below the top of the vial, allowing the end with the swab tip to remain in the liquid.

Throat specimen (Oropharyngeal swab [OP])

- **If nasopharyngeal specimen can not be collected due to inability to procure np swabs, a throat swab can be sent as an alternative specimen.**
- ***NOTE****: Throat swab tips must be synthetic (ex: polyester, rayon, or dacron). Cotton or*
- *calcium alginate tipped, or wooden shaft swabs are unacceptable*
- Use a throat swab to collect specimen by swabbing the patient's posterior pharynx and tonsillar area (avoid the tongue).

- Insert the swab into the vial of UTM. If the swab shaft extends past the top of the tube, clip it so that the top of the swab shaft it is just below the top of the tube allowing the end with the swab tip to remain in the liquid. The swab tip must be immersed in the liquid.

- Securely tighten the cap on the tube of UTM and recheck to make certain it is labeled with two patient identifiers. Write “NP” or “OP” on the tube of UTM. Insert tube into specimen transport bag and close bag tightly.
- • Complete a RI State Health Laboratories test requisition form. For test requested, write “COVID-19" under Comments/Other test requests. Ensure that all information is legible, complete and accurate. Place the completed form into the outside pocket of the specimen bag. Do **not** enclose it inside the bag with the specimen tube.

- **Holding:**
- Store specimens refrigerated (2 – 8 °C) until ready to send to the state laboratory. Specimens may be held refrigerated for up to 72 hours. Specimens must be received at the RI State Health Laboratories within three days of being collected.

Packaging

- Specimens must be packaged and shipped in accordance with appropriate Department of Transportation (DOT) regulations for Category B Biological Substances.
- • Place the securely sealed Ziploc bag containing the specimen tube **along with the frozen ice pack** into the styrofoam box that is contained within the cardboard shipping box. If using an alternate type of packaging, make certain it is compliant and labeled appropriately for Category B Biological Substances. • Ensure that the outer packing box that is supplied with the specimen kit is sealed securely with packaging tape.
- • Ensure shipper label information for your facility is completed in full and affixed to the outer package.

Transport:

- ➢ Submitters are responsible for arranging for specimens to be transported to the RI State Health Laboratory. (ex: commercial courier)

Dialysis protocol for COVID-19 patients

Guidelines for Haemodialysis →

- •Patient to screening area is suspected nasal swab for COVID-19.
- •Wait for the result.
- •If positive, all protection and protocol for any COVID patient should be followed and the patient should be dialysed on a dedicated machine.

General Guidance for Dialysis Unit →

- •Dedicated dialysis machines for COVID-19.
- •Trained staff
- •Ensure full personal protection, sanitization and environmental disinfection.
- •All universal precautions must be strictly followed.
- •Area should have doffing and donning with separate entry and exit for doctors and patients.

Patients inside Dialysis Unit

- Suspected or positive COVID-19 patients should properly wear disposable three-layer surgical mask throughout dialysis duration.
- •Patients should wash hands with soap and water for at least 20 seconds, using proper method of hand washing. If soap and water are not readily available, a hand sanitizer containing at least 60% alcohol can be used.
- •Patients should follow cough etiquettes, like coughing or sneezing using the inside of the elbow or using tissue paper.
- •Patients should throw used tissues in the trash. The unit should ensure the availability of plastic lined trash cans appropriately labelled for disposing of used tissues. The trash cans should be foot operated ideally to prevent hand contact with infective material.

For Dialysis Staff

- Full protection with PPEs and N95 masks.
- •Each dialysis chair/bed should have disposable tissues and waste disposal bins to ensure adherence to hand and respiratory hygiene, and cough etiquette and appropriate alcohol-based hand sanitizer within reach of patients and staff.
- •Ideally all patients with suspected or positive COVID-19 be dialyzed in isolation. If not enough, then distance between two patients should be more than 2m
- •Separating equipments like stethoscopes, thermometers, Oxygen saturation probes and blood pressure cuffs between patients with appropriate cleaning and disinfection should be done in between shifts

Disinfection→

- •Disinfection of machines, bedsheets, beds and surrounding equipment should be done after each dialysis.
- •All disposables, tubes, catheters should be disposed.

Dialysis Patient with Acute Kidney Injury (AKI)→

- •In case of acute renal disease, if it is an emergency, bed side dialysis can be done following all standard precautions.
- •Disinfection and sanitization of all machines and equipment must be performed as per standard protocol.

Cardiology patient care for Acute Coronary Syndromes

- •COVID symptoms can often overlap with cardiac symptoms, especially in cases with acute coronary syndrome (ACS) so extreme precautions to be taken while approaching these cases
- •It is important to rapidly identify and triage patients who have suspected COVID-19 infection and underlying cardiovascular disease
- •All such cardiac patients coming to emergency need screening for COVID-19 risk

What should be the screening strategy in the triage area

Based on History

- –Symptoms of breathlessness, cough, fever, contact, travel
- •Based on above, the exposure risk can be categorized according to the following:
- –Low risk: No Sx of breathlessness, cough, fever, contact,travel
- –High risk: Above symptoms ++, pt on O2, or abnormal X ray, if available

- However cardiac and COVID-19 patients can often have an overlap of such symptoms esp breathlessness/cough and in times of possible community spread h/o contact and travel may not be very discerning in this regard

- Ideally, ALL patients with acute coronary syndromes being considered for admission need to be lab tested for COVID BEFORE proceeding foradmission
- •The advantage of such an approach will be to avoid a RERTOSPECTIVE diagnosis of a positive COVID-19 case after admission, which, if happens, meansinadvertent exposure to a large number of health care workers as well as other patients

- **Logistics often preclude rapid discrimination of negative or positive status, as results are currently available only after 12-24 hours**
- **•Hence an isolation ward/facility needs to be available where such patients can wait while their test report is pending**

When to intervene in a case of ACS

- **The decision to intervene from a cardiac point is individualized and needs to be balanced between**
- **–Risks of exposure to staff and inappropriate utilization of PPE**
- **–Perceived urgencyof the procedure: This is best a joint decision between the cardiologists/other clinicians as needed/and of course the patient**

ST elevation MI

- **•In stable patients with STEMI (within 12 hours), send the COVID-19 test, performthrombolysis (in isolation area) using all necessary precautions to avoid exposure to healthcare workers.**
- **–Transfer to Cardiology Ward for further management if COVID test –ve**
- **–Transfer to dedicated COVID facility if test is +**
- **•In stable patients with STEMI (> 12 hours), where benefits of a delayed thrombolysis may be debatable, it is always prudent to await the result of the COVID test before considering PCI**

- **In any unstable patients with STEMI and ongoing ischemia, send theCOVID-19 test first, and if proceeding to cath lab is considered very urgent and life-saving pending test report, perform procedure under full PPE cover**

Non ST elevation MI

- **Remember troponinleaks reflecting Type II myocardial injury may be seen in ~ 5-10%**
- **•Hence don't over-rely on troponins**
- **•In stable, NSTEMI patients, conservative treatment is preferred until a COVID-19 negative test has been obtained, and further decisions can then be made**
- **–Transfer to Cardiology Ward for further management if COVID test –ve**
- **–Transfer to dedicated COVID facility if test is +**
- **•In unstable NSTEMI patients, where instability is perceived to be due to ACS, if proceeding to cathlab is urgent, send the test, and perform procedure under full PPE cover**

Catheterization lab rules

- **•Although to be avoided, if a patient undergoes an urgent cardiac catheterization, and COVID-19 test report is still awaited, the case be done with full precautions and PPE cover. Also for all such cases, interventions should have concurrence of team faculty members since each procedure puts all staff involved at considerable risk**
- **•Patients with severe ARDS like picture should not be brought to the catheterization laboratory, patients with COVID-19 or suspected COVID-19 requiring intubation should be intubated prior to arrival in the lab**

- **Make efforts to avoid emergent intubation in the catheterization laboratory as this is an aerosol generating procedure with increased exposure risk to the lab personnel**
- **•Deferment of all non-urgent procedures to reduce demand on beds, use of PPE, staff and other resources**

- **All cardiology team members should be familiarized with correct protocols of donning and doffing of PPE.**
- **•Fragmentation of staff into teams is desirable and can reduce risk of exposure**
- **•All efforts should be made to minimize the number of scrubbed operators to decrease the risk of exposure and over-utilization of PPE kits**
- **•Specific institutional protocols for vigorous terminal clean following the procedure. (Remember that most catheterization labs do not have –ve pressure ventilation). If possible restriction of cases to a dedicated laboratory may be considered**

Disinfecting the cardiac catheterization lab

- **•UV light exposure to 56°C for 30 min, Lipid solvents (Diethyl ether, 75% ethanol, Chlorine containing disinfectants, Per acetic acid &Chloroform) effectively inactivate COVID-19 organism while Chlorhexidine is considered ineffective**
- **•Hydrogen peroxide (3%) spray (mist/fogging)can be used for air disinfection**
- **•Instruments should be cleaned with 2000 mg/L chlorine-containing disinfecting solution or1% hypochlorite and wiped with water after 30 minutes**

- **The floor and wall (1.5 m from the floor and below) should be wiped with 2000 mg/L Chlorinated disinfectant solution, and sprayed with 3% hydrogen peroxide again if necessary**
- **•After disinfection, the Hospital infection control committee/Microbiology should be consulted prior to using the lab again**

Gynecology & Obstetrics Protocols

- Should have dedicated and fully equipped ward with separate entry/exit.
- Dedicated COVID positive OT and labour room to be earmarked.
- •Suspected pregnant COVID women should be sent to TRIAGE area or suspected isolation ward.
- •Nasal swab for COVID-19
- •Connect pulse oximeter. Take SPO2 hourly; oxygen saturation more than 94%.

All this should be done in complete precaution (PPE and N95 mask)

- •If not in labour, keep the patient there
- •If in labour, try to perform vaginal delivery, otherwise LSCS in dedicated OT with all precaution
- •Cut short second stage of labour in vaginal delivery, if patient is exhausted or hypoxic.
- •Early cord clamping can be done

- LSCS to be done preferably in spinal or epidural anaesthesia over GA (Aerosol contamination can occur).
- •Post delivery patient should be sent to TRIAGE or suspected isolation ward.
- •Breast feeding is debatable, prefer expressed breast milk, otherwise mother can feed with full protection.

Transmission

- •With regard to vertical transmission (transmission from mother to baby antenatally or intrapartum), emerging evidence now suggests that vertical transmission is probable, although the proportion of pregnancies affected and the significance to the neonate has yet to be determined.
- •At present, there are no recorded cases of vaginal secretions being tested positive for COVID-19.
- •At present, there are no recorded cases of breast milk being tested positive for COVID-19.

INFECTION PREVENTION AND CONTROL

Benefits of IPC

Protecting yourself

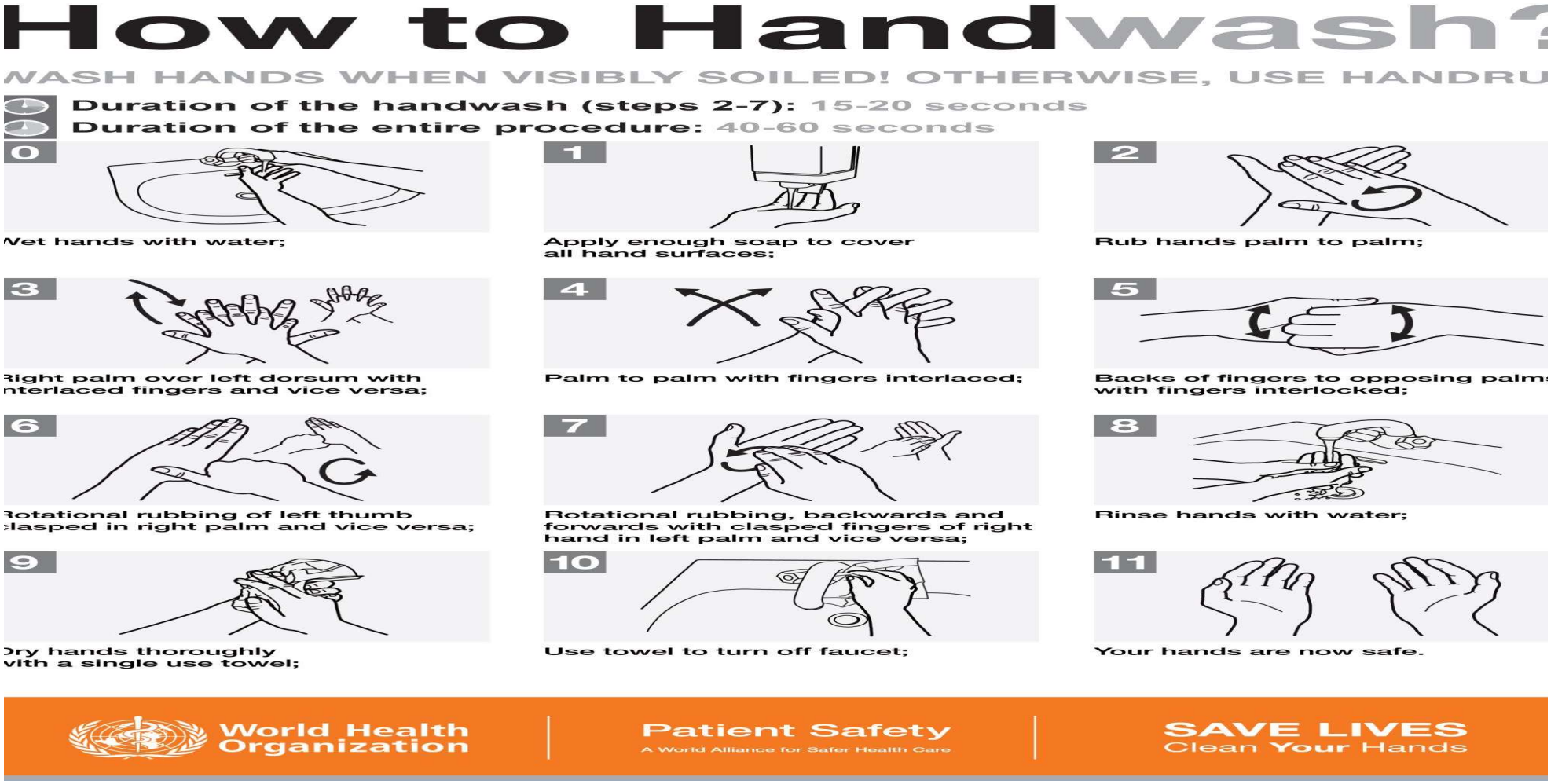
Protecting your patients

Protecting your family, community & environment

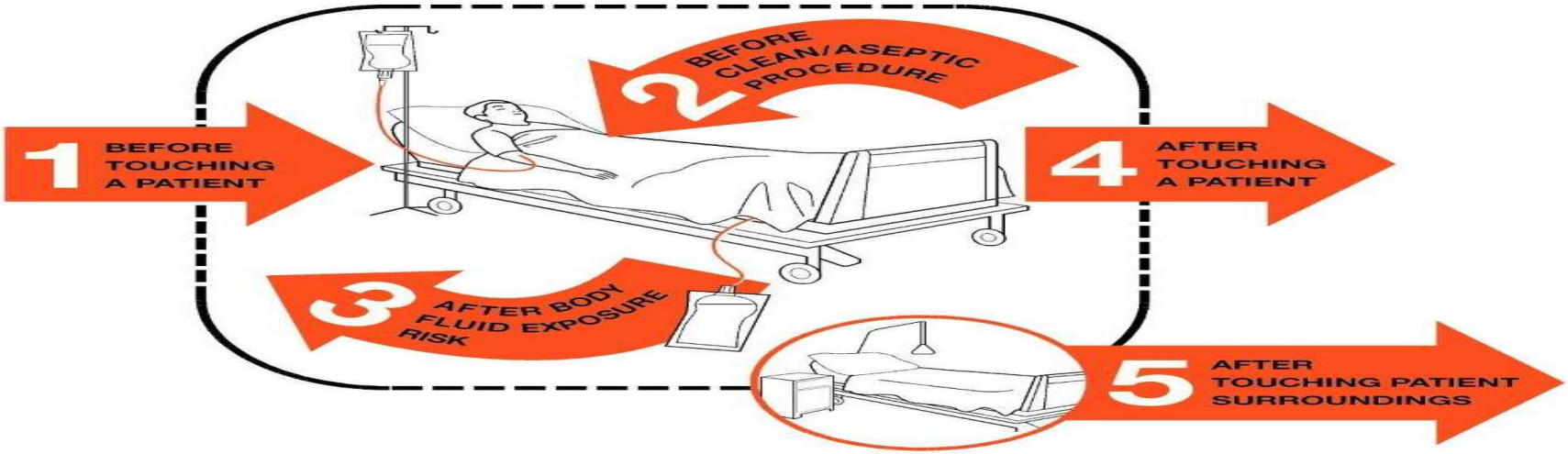
Elements of Standard Precautions

- •Hand hygiene
- •Respiratory hygiene
- •PPE as per risk
- •PPE donning and doffing
- •Environment cleaning & disinfection
- •Safe handling and cleaning of soiled linen/patient cloth
- •Waste management

Hand Hygiene



Your 5 Moments for Hand Hygiene



1	BEFORE TOUCHING A PATIENT	WHEN?	Clean your hands before touching a patient when approaching him/her.
		WHY?	To protect the patient against harmful germs carried on your hands.
2	BEFORE CLEAN/ ASEPTIC PROCEDURE	WHEN?	Clean your hands immediately before performing a clean/aseptic procedure.
		WHY?	To protect the patient against harmful germs, including the patient's own, from entering his/her body.
3	AFTER BODY FLUID EXPOSURE RISK	WHEN?	Clean your hands immediately after an exposure risk to body fluids (and after glove removal).
		WHY?	To protect yourself and the health-care environment from harmful patient germs.
4	AFTER TOUCHING A PATIENT	WHEN?	Clean your hands after touching a patient and her/his immediate surroundings, when leaving the patient's side.
		WHY?	To protect yourself and the health-care environment from harmful patient germs.
5	AFTER TOUCHING PATIENT SURROUNDINGS	WHEN?	Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving – even if the patient has not been touched.
		WHY?	To protect yourself and the health-care environment from harmful patient germs.

World Health Organization | Patient Safety — A World Alliance for Safer Health Care | SAVE LIVES Clean Your Hands

WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.

May 2009

Steps of hand rub/Hand wash

- •Remove Jewellery before hand rub/hand wash
- •Duration for hand rub: 15-20 seconds
- •Duration for hand wash: 40-60 s
- •Volume of hand sanitizer: ~ 3 ml
- •Volume of soap (medicated): enough to produce leather
- •VERY IMPORTANT: Rub hands together until **dry (for Hand rub)**
- •Rub all surfaces thoroughly doing 6 steps.

When is hand hygiene a must?

Before

- touching any devices/equipment attached to patient
- Indwelling catheter
- Any other drain
- Ventilation equipment
- Drawing a specimen/placing IV line

After

- All above activities
- After touching door/ almirah handles
- Handling patient chart/monitor
- Touching own nose/mouth/hair

Respiratory hygiene

Avoid patient care areas if you have a respiratory infection. Stay home if possible. Wear a mask during hospital visits.

Wash hands with soap and water

PPE for use in health care for COVID-19

Face Mask

Nose + mouth

N95 Mask

Nose + mouth

Face shield

Eyes + nose + mouth

Goggle

Eyes

Gown

Body

Apron

Body

Gloves

Hands

Head cover

Head + hair

Gloves: types and usage

- •Gloves do reduce degree of contamination of hands (16 CFUs/min to 3 CFU/min of patient care activities)
- •**Gloves** may be Non-sterile/ sterile, non-powder gloves (Latex or Nitrile).
- •Gloves should always be inspected before use to check they are intact.
- •**Caution**: Gloves do NOT mean complete protection. Small unnoticed tears may be present/ hand contamination can occur during glove removal.
- •Hand hygiene MUST be practiced after glove removal

Usage of Mask

- •**Masks**-Use-N 95
- •When examining the known positive patient
- •When taking samples from suspect cases
- •When doing bacterial cultures of respiratory samples(from COVID-19 suspected cases) in biosafety cabinets.
- •When doing RNA extraction in biosafety cabinets
- **(If N 95 is not available use triple layered surgical mask. Use triple layered for all other specimens)**
- ***Do not touch front portion of mask with hands while or after working***

GOWN

- •Single-use long-sleeved fluid-resistant or
- •Reusable non-fluid-resistant gowns
- •Plastic aprons (to be used on non-fluid-resistant gowns)
- •Quality of gowns depends on-
- •Weight in grams per square metre (GSM value)-40/70/95 GSM
- •Fabric strength test-tensility & strength test
- •Seam & joint test-to see if leakage can occur
- •Moisture vapour transmission test
- •Synthetic blood penetration test

EYEWEAR

- •Goggles fit the face immediately surrounding the eyes and form a protective seal around the eyes.
- •This prevents aerosols from entering under or around the goggles.

Head covers and shoe covers

- •Shoe and head covers provide a barrier against possible exposure within a contaminated environment.
- •They must be fluid resistant & preferably of the same material as gown.

Prerequisites before donning PPE

- •Wear Scrub suit or ICU dress before donning
- •Do a hand hygiene
- •Select PPE of correct size
- •Always put on PPE before contact with the COVID 19 patient.
- •**Wear PPE only in designated DONNING area**.

Points to remember for PPE

- •Always remove PPE after completing the task
- •Disinfect the PPE components before discarding
- •Never reuse until instructed (Clean & disinfect before reuse)
- •Change PPE if it has any defect or gets contaminated during procedure.
- •Remove carefully to avoid contamination/infection.
- •**Do NOT touch PPE components from front after using.**
- •**Never touch your face or anybody part while using PPE.**

Putting on (Donning) PPE

- 1.Perform hand hygiene
- 2.Put on scrub suit/ICU dress
- 3.Put on protective pants
- 4.Both Shoe covers
- 5.Gown
- 6.Inner pair of gloves
- 7.Mask
- 8.Head cover
- 9.Eye cover
- 10.Face shield
- 11.Outer pair of gloves

Putting off (doffing) PPE

- 1.Take out outer pair of gloves
- 2.Do hand hygiene over inner pair gloves with hand rub
- 3.Remove shoe cover (Disinfect with 70% alcohol)
- 4.Do hand hygiene on inner glove with hand rub
- 5.Remove face shield/eye cover (Disinfect with 70% alcohol)
- 6.Do hand hygiene again on inner gloves
- 7.Remove head gear (Disinfect with 70% alcohol)
- 8.Do hand hygiene again on inner pair gloves with hand rub

Putting off (doffing) PPE

- 9.Remove gown (Disinfect with 70% alcohol)
- 10.Do hand hygiene again on inner gloves
- 11.Remove Mask (Disinfect with 70% alcohol)
- 12.Remove disposable pants (Disinfect with 70% alcohol)
- 13.Remove inner pair of gloves (Disinfect with 70% alcohol)
- 14.Do hand hygiene with hand rub

Environment & equipment surfaces to be cleaned and disinfected daily

- **•Bed rails,**
- **•Bed matress**
- **•I.V pole**
- **•Medicine trolly**
- **•Monitors**
- **•Ventilator tubings/ surfaces**
- **•Keyboard**
- **•Telephone receivers**
- **•Door handles/knobs**
- **•Stethoscope diaphragm/ other components**
- **•Floor & walls**
- **•Window sills**
- **•Sister desk**
- **•Table surfaces**
- **•Almirah handles and surfaces**
- **•Toilet seats and its surfaces (including floor and walls of toilets)**
- **•Toilet taps/ health faucets**

Cleaning of small equipments

- •Use 70% isopropyl alcohol:
- •Stethoscope
- •BP cuffs
- •Rubber stoppers of multi-dose vials
- •Small instrument surfaces
- •All other surfaces in fever OPD-clean with detergent and water followed by disinfection with cotton cloth dipped in 0.5% hypochlorite.

High-touch surfaces

- •Examples:
- ✓Almirahhandles
- ✓Telephones, call bells, computer keyboards
- ✓Light switches, edges of privacy curtains
- •Require more frequent cleaning and disinfection than minimal contact surfaces
- •Cleaning and disinfection is to be done daily and more frequently if the risk of environmental contamination is higher.

ENVIRONMENT SURFACE CLEANING At Trauma emergency (includes Beds/ bed mattress /patient trolly/i.v poles/ medicine trolly/ventilator surfaces/ humidifiers/ monitors/ tubing surfaces

- •Surface cleaning has to be done three times in a day.
- •***Wear PPE before doing disinfection and cleaning procedure.***

- ***•First clean thoroughly with detergent and water with a clean cotton gauge piece. Let it dry (if the cloth becomes dirty enough, change the cloth)***
- ***•After drying disinfect with 0.5% hypochlorite or bleaching powder solution (Several wipes may be required to disinfect a surface)***
- ***•Metal surfaces: Disinfect with 0.5% hypochlorite or bleaching powder followed by disinfection with 70% alcohol after 5-10 minutes.***
- •Floor and wall cleaning and disinfection are to be done with 7.35% H2O2 and 0.23% peracetic acid.
- ***•Wash your hands with soap and water after doffing PPE.***

OT at Trauma emergency

- •Sterilise & disinfect the OT after every infected surgery/ COVID suspect/ positive patient surgery.
- •Do fogging with H2O2 based disinfectant (e.g 7.35% w/v H2O2 and 0.23% w/v per acetic acid or H202 with 0.01% w/v Silver nitrate IP, 10% w/v Hydrogen Peroxide)
- •All surface needs to be disinfected properly with 0.5% hypochlorite.
- •Walls and floor are to be disinfected with 0.5% hypochlorite/ bleaching powder solution.

ENVIRONMENT SURFACE CLEANING OF CORONA WARD (includes Beds/ bed mattress /patient trolly/i.v poles/ medicine trolly/ventilator surfaces/ humidifiers/ monitors/ tubing surfaces

1. Surface cleaning has to be done three times in a day or whenever surfaces are visibly soiled or when contamination of the environment is suspected (such as after doing aerosol generating procedure).
2. ***Wear PPE before doing disinfection and cleaning procedure.***
3. ***First clean thoroughly with detergent and water with a clean cotton gauge piece. Let it dry (if the cloth becomes dirty enough, change the cloth)***
4. ***After drying disinfect with H2O2 wipes (Several wipes may be required to clean a surface)***
5. Floor and wall cleaning and disinfection are to be done with 7.35% H2O2 and 0.23% peracetic acid. (***Use 3 bucket system for floor cleaning***)
6. ***Discard gauge piece and PPE in yellow bins after surface disinfection.***
7. ***Wash your hands with soap and water after doffing PPE.***

Environment cleaning outside wards/isolation rooms: (*include High/low touch surfaces of corridors, Lift, ramp*)

1. Cleaning is to be done thrice in a day or whenever surfaces are visibly soiled or when contamination of the environment is suspected (such as after patient sneeze/ cough on surfaces).
2. ***Wear PPE before doing disinfection and cleaning procedure.***
3. Clean with detergent and water followed by cleaning with 0.5% hypochlorite solution (prepare by mixing 1 part of 5-6% sodium hypochlorite to 9 part of water) or with bleaching powder solution (prepare by mixing 4 teaspoon in 1 litre of water).
4. For metal surfaces this should be followed by wiping with 70% isopropyl or ethyl alcohol.
5. Walls must be cleaned with detergent and water followed by disinfection with 0.5% hypochlorite solution or with bleaching powder solution.
6. Floor and surface cleaning and disinfection are to be done with 0.5% hypochlorite solution or with bleaching powder solution. (***Use 3 bucket system***)
7. Take off PPE and wash hands with soap and water.

Cleaning of floors

- •Remove gross soil (visible to naked eye) prior to cleaning and disinfection
- •If any needle or sharps are there in the floor segregate in puncture proof box safely
- •Use separate mop for different areas (lab area,corridors,offices)
- **•DO NOT USE BROOM/VACUUM CLEANERS**
- •Use dust control mop prior to wet mop
- •Do not lift dust mop off the floor use swivel motion, never shake the mop, minimize turbulence.

- Progress from the least soiled areas (low-touch) to the most soiled areas (high-touch) and from high surfaces to low surfaces
- •Wash the mop under running water before doing wet mopping
- •An area of 120 square feet to be mopped before re-dipping the mop in the solution
- •Cleaning solution to be changed after cleaning an area of 240 square feet
- •Change more frequently in heavily contaminated areas, when visibly soiled and immediately after cleaning blood and body fluid spills

Triple bucket system

- Floor cleaning
- Procedure for washing, rinsing, and sanitizing where a different bucket and sponge or mop is used for each task
- **For washing:**
  - ✓ First bucket with water and detergent is used only for this purpose and will not be used for rinsing or sanitizing
- **For Rinsing:**
  - ✓ Second bucket with water only, will be used solely for this purpose.
- **A third bucket:**
  - ✓ Containing water and a disinfectant solution shall be used for disinfection only

Disinfecting Ambulance

- Driver of ambulance must wear personal protective equipment (PPE)
- patient and attendant should be provided with triple-layer mask and gloves
- Disinfect all surfaces within ambulance with detergent and water followed by 1% hypochlorite solution. (and all metal surfaces to be also disinfected with 70% alcohol after using hypochlorite)
- Disinfect the floor of ambulance with 1 % hypochlorite solution

After cleaning

- •If disposable pads are used-discard them in yellow bag
- •After cleaning, wash the cloth with detergent and sun dry
- •Launder mop heads daily
- •All washed mop heads must be dried thoroughly before re-use.
- •Clean sanitation cart and carts used to transport biomedical waste daily.
- •All attachments of machines should be removed, emptied, cleaned and dried before storing.

Laundring patient clothes

- •Place soiled cloths in designated container for laundering
- •Do not shake the clothes
- •Patient clothes laundry is to be done by dipping in 0.5% hypochlorite solution for 30 minutes followed by washing with detergent and hot water (70 ^{0}C)
- •Or the patient may dispose clothes in yellow bins for incineration

Safe handling and cleaning of soiled linen

1. **Wear PPE before taking out dirty linen.**
2. **Do not shake the linen.**
3. Carry soiled linen in covered containers or yellow colour plastic bags to prevent spills and splashes, and confine the soiled linen to designated areas (interim storage area) until transported to the laundry.
4. These bags must be labelled with a sign of Corona Ward.
5. ***Wash hands with soap and water after discarding PPE.***

BIOMEDICAL WASTE MANAGEMENT

Labelling of Waste

- •All waste has to be in double layered medical waste bags.
- •Label the waste as COVID-19 waste
- •Spray 0.5% hypochlorite to decontaminate outer surface

3 BINS, 01 CONTAINER & 01 BOX

General waste

Human anatomical waste
Chemo drugs
Soiled waste
Expired or Discarded Medicines, soiled linen

Contaminated Plastic Waste (Recyclable)

Waste sharps including Metals

Glassware:
Broken or discarded and contaminated glass including medicine vials and ampoules

Black Bin

- Only in quarantine area/ office area/ trauma emergency area.
- Treat the non infected routine waste as general solid waste and dispose to local municipal as per SWM rule, 2016.

Spill management

- Worker assigned to clean the spill should wear gloves and other personal protective equipment
- Most of the organic matter of the spill to be removed with absorbent material
- Surface to be cleaned to remove residual organic matter
- Use disinfectant: hypochlorite
  - 1% for small spills
  - 10% for large spills

- •Cover the spill with absorbent cotton or a cloth.
- •Disinfect the surface with 10% bleach for 10-15 minutes.
- •Now use cloth or cotton to absorb the spill
- •Collect the spill with scoop and discard it in the yellow/ red bag.
- •Finally mop with detergent and water.

Handling dead bodies

- •Fill all openings of dead body with cotton balls or gauge dipped in 1% hypochlorite.
- •Remove all tubings and discard in appropriate bin.
- •Wrap the body with double layer cloth soaked in 1% hypochlorite
- •Wrap again in leak proof wrapping sheet.
- •Disinfect the surface with 1% hypochlorite.
- •Transfer the body through separate passage to mortuary. Wear PPE while transporting.

Thanks

CMO Office, Agra