सत्यमेव जयते

Government of India

Ministry of Environment, Forest and Climate Change

AIR POLLUTION & COVID-19 MITIGATION STRATEGIES

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आर पी गुप्ता
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FOREWORD

It is recognized globally that COVID-19 has caused a serious impact on human health by affecting the respiratory system. Among all the people, COVID-19 could disproportionately affect the vulnerable population i.e. elderly and people with diseases. The higher levels of air pollution also increase the susceptibility of COVID-19 especially in the vulnerable population. The poor air quality affects our lungs and other body organs, increasing the risk of various respiratory diseases. Understanding the correlation of poor air quality and COVID-19 is extremely important to respond wisely to reduce the impact on respiratory system. In COVID-19 times, air pollution can worsen the health condition of a person with respiratory and circulatory diseases and may lead to severity of cases.

Bringing awareness about air pollution sources (indoor as well as ambient) and associated health impacts in COVID-19 times has become utmost important. Addressing the issue of air pollution will help and lead to decline in morbidity and mortality as well as decline in respirable related illnesses during COVID-19 pandemic. To address these issues complete awareness and preventive measures about poor air quality and COVID-19 is very essential.

I commend the efforts of Dr.Suman Mor, Department of Environment Studies, Panjab University, Chandigarh and Dr. Ravindra Khaiwal, Department of Community Medicine & School of Public Health, Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh for bringing out the infographic booklet on "Air Pollution & COVID-19 Mitigation Strategies."

I am sure that this infographic booklet on air pollution & COVID-19 mitigation strategies will help to create awareness among the public and aid to minimize the adverse health impact of air pollution and COVID-19.

(R P Gupta)

New Delhi
18th February, 2021

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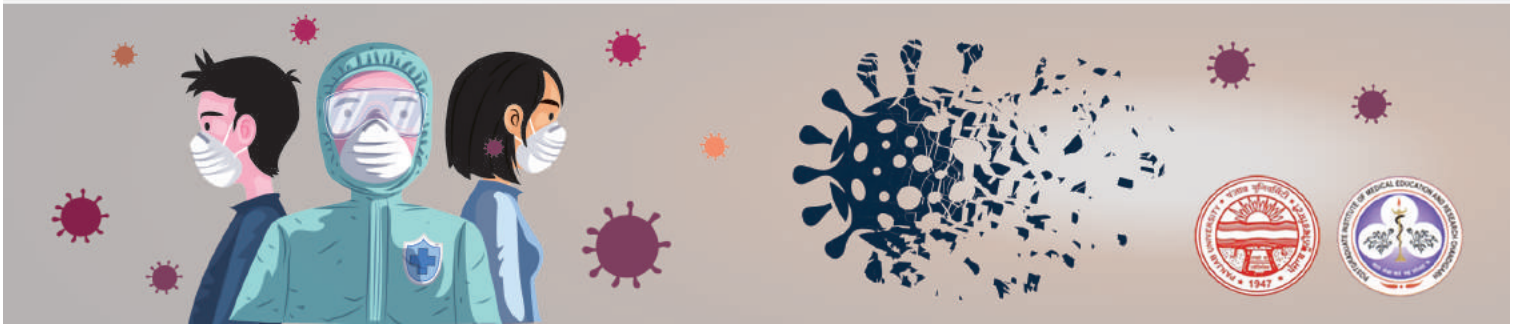
AIR QUALITY INDEX	0-50	51-100	101- 200	201-300	301-400	401-500	>500
	Good	Satisfactory	Moderate	Poor	Very Poor	Severe	Emergency

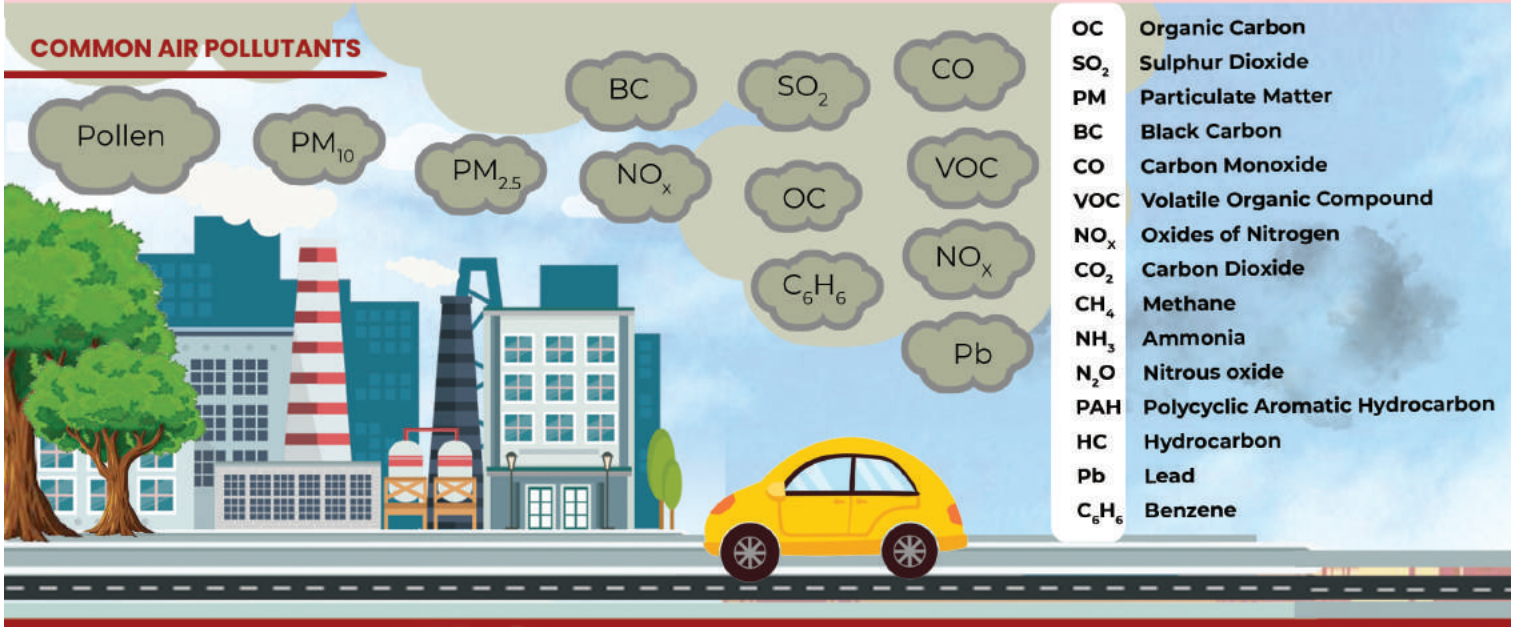
This booklet is based on current knowledge & may need to be updated with the emerging evidence.



OUTDOOR AIR POLLUTION

MAJOR SOURCES

COMMON AIR POLLUTANTS



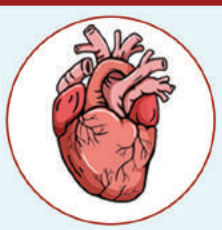
OC	Organic Carbon
SO_2	Sulphur Dioxide
PM	Particulate Matter
BC	Black Carbon
CO	Carbon Monoxide
VOC	Volatile Organic Compound
NO_x	Oxides of Nitrogen
CO_2	Carbon Dioxide
CH_4	Methane
NH_3	Ammonia
N_2O	Nitrous oxide
PAH	Polycyclic Aromatic Hydrocarbon
HC	Hydrocarbon
Pb	Lead
C_6H_6	Benzene

HEALTH IMPACTS

Acute lower respiratory infections In children

Stroke

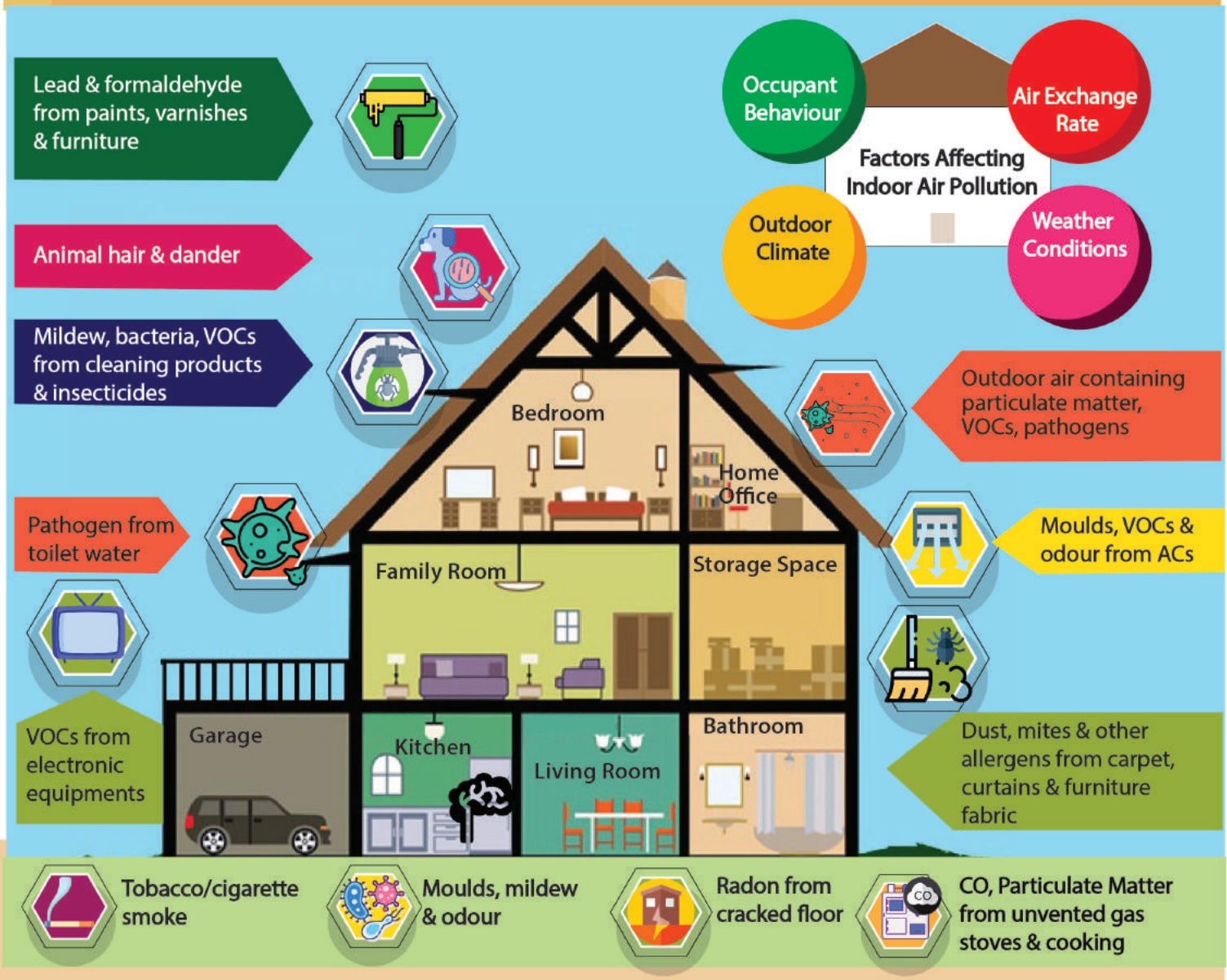
Chronic Obstructive Pulmonary Disease



Ischaemic Heart diseases

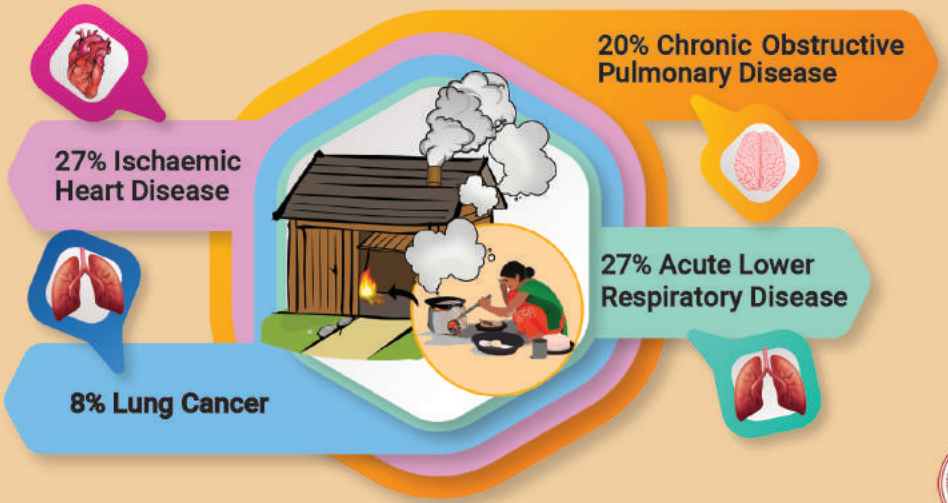
Lung Cancer

INDOOR AIR POLLUTION



HOUSEHOLD AIR POLLUTION

Globally Attributed to Premature Deaths



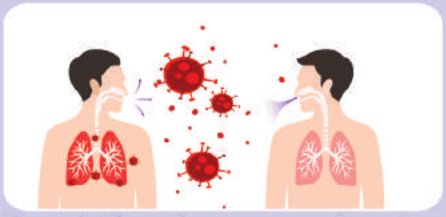
LINKAGES BETWEEN AIR POLLUTION & COVID-19

COVID-19 is an infectious disease caused by corona virus (SARS-CoV-2) & primarily transmits through exposure to virus carrying respiratory droplets

COVID-19 CORONAVIRUS DISEASE

Transmission can be through multiple ways:

DROPLET TRANSMISSION:



Spread through exposure to virus containing respiratory droplets exhaled by an infected person

CONTACT TRANSMISSION:

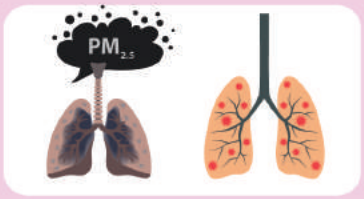
Spread through direct contact with an infected person or his belongings

AIRBORNE TRANSMISSION:

Spread through exposure to virus containing aerosols laden smaller droplets & particles which remain suspended in air & can travel longer distance

LINKAGES BETWEEN COVID-19 & AIR QUALITY

COVID-19 is mainly a disease of respiratory system & high air pollution will increase the susceptibility especially in the vulnerable population



Air Pollution & COVID-19

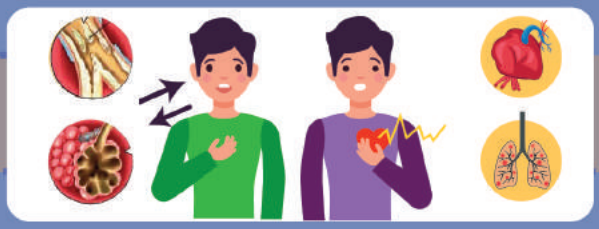
Air Pollution & Health Effects

Vulnerable Group

POOR AIR QUALITY & COVID-19

- Globally, 7 million premature deaths are attributable air pollution & around 94% of these deaths occur in low & middle income countries

- Air pollution is most likely a contribuing factor to the health burden caused by COVID-19

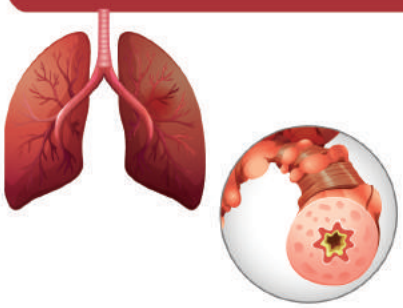


- Poor air quality is a main risk factor for both acute & chronic, respiratory & cardiovascular disease

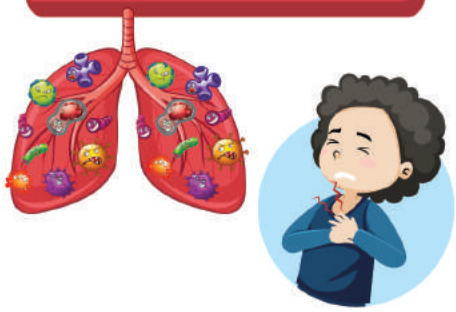
- People with underlying medical conditions are at greater risk of developing severe illness from COVID-19 infection

POOR AIR QUALITY & COVID-19

CHRONIC OBSTRUCTIVE PULMONARY DISEASE



PNEUMONIA

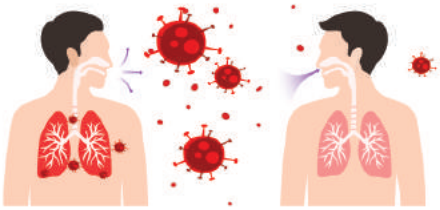


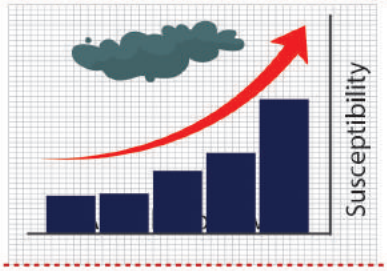
ASTHMA

Poor air quality affects our lungs & other body organs. It increases the risk of chronic respiratory diseases like COPD, asthma, pneumonia etc.

AIR POLLUTION & CARDIOVASCULAR DISEASE PROGRESSION

The micro particles ($<PM_{2.5}$) have potential to reach the bloodstream & can affect our cardiovascular & circulatory system





COVID-19 is caused by respiratory pathogen & high air pollution can increase the susceptibility especially in the vulnerable population

Check AQI directly
https://app.cpcbccr.com/AQI_India

Know your city's AQI

Air pollution can exacerbate respiratory & circulatory diseases in patients & vulnerable population & can also increase the severity of development of more serious illnesses

PREVENTING AIR POLLUTION & COVID-19
: HOUSEHOLD & INDOOR AIR POLLUTION

IMPROVE HOUSEHOLD AIR QUALITY

Cook in a well ventilated area or kitchen

While cooking keep windows open

Cooking with wet fuel create more emissions, hence more harmful to health

Avoid cooking in enclosed environment using solid biomass fuel

Schemes to Promote Healthy Clean Fuel

PRADHAN MANTRI UJJWALA YOJANA (PMUY)

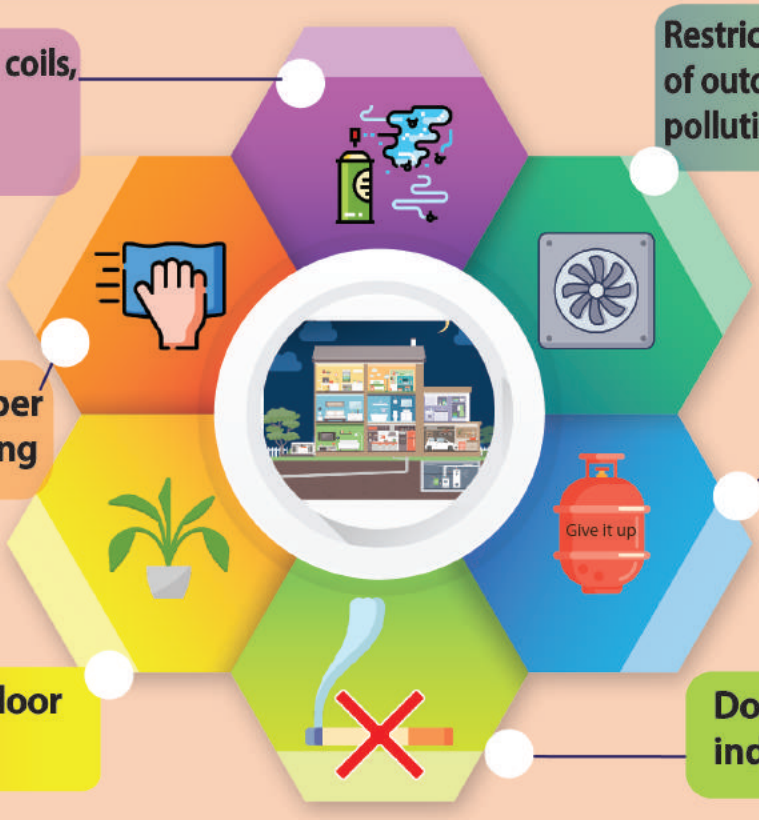
#GiveItUp
Feel the Joy of Giving
GIVE IT UP

DIRECT BENEFIT TRANSFER FOR LPG (DBTL)
PAHAL

IMPROVE INDOOR AIR QUALITY

Avoid using mosquito coils, incense sticks, room freshners

Restrict the indoor infiltration of outdoor air during high pollution levels



Use swabs & microfiber cloths for daily dusting

Use cleaner fuels while cooking

Use more indoor plants

Don't allow smoking indoors

PREVENTING AIR POLLUTION & COVID-19
: IMPROVE VENTILATION

People spending prolonged hours in confined & poorly ventilated rooms are at high risk of COVID-19 transmisssion

Improve ventilation in indoor environment (e.g. office/workplace, hospital, schools cinema halls, shopping malls)

Get fresh air all time by proper ventilation at home

Happy & healthy family

Contaminant free

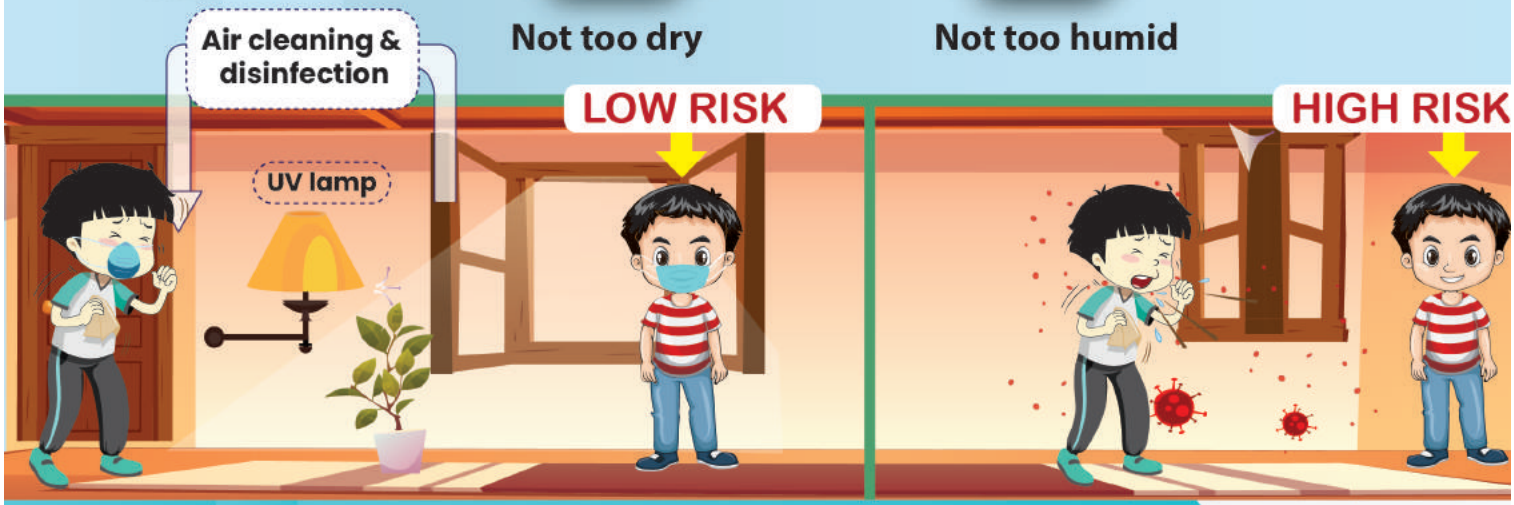
Fresh

Not too dry

Ventilated

Not too humid

Cool enough



Ensure adequate ventilation system during winter & according to outdoor AQI level

Adequate ventilation help to prevent the spread of COVID-19 in indoor environment

PREVENTING AIR POLLUTION & COVID-19
: GRADED RESPONSE ACTION PLAN

Severe+ or Emergency

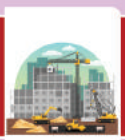
($PM_{2.5}$ over 300 µg/m^3 or PM_{10} over 500 µg/m^3 for 48+hours)

- City may restrict the entry of heavy vehicle (e.g. Trucks) except for essential commodities 
- Introduce odd/even scheme for private vehicles & minimise exemptions 

- Stop construction work 
- Set up a task force to decide any additional steps including shutting of schools 

Severe

($PM_{2.5}$ over 250 µg/m^3 or PM_{10} over 430 µg/m^3)

- Close brick kilns, hot mix plants, stone crushers 
- Maximise power generation from natural gas to reduce generation from coal 
- Encourage public transport, with differential rates 
- More frequent mechanized cleaning of road & sprinkling of water 

Very Poor

($PM_{2.5}$ 121-250 µg/m^3 or PM_{10} 351-430 µg/m^3)

- Stop use of diesel generator sets 
- Increase bus & Metro services 
- Enhance parking fee by 3-4 times 

- Apartment owners to discourage burning fires in winter by providing electric heaters during winter 

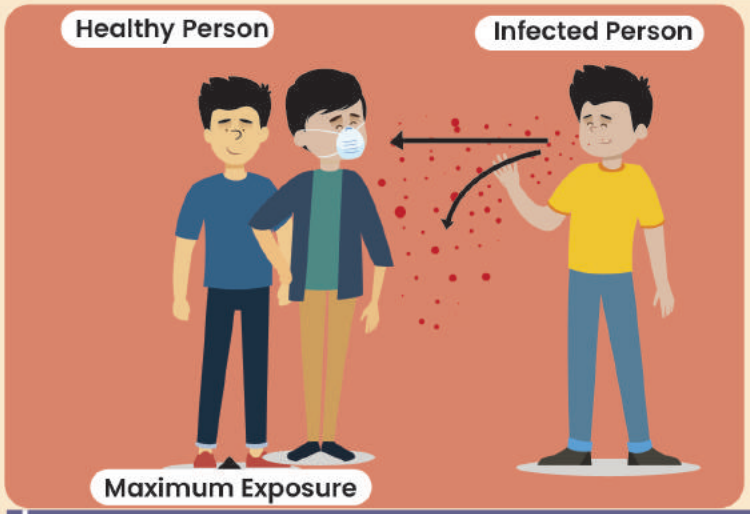
Moderate to poor

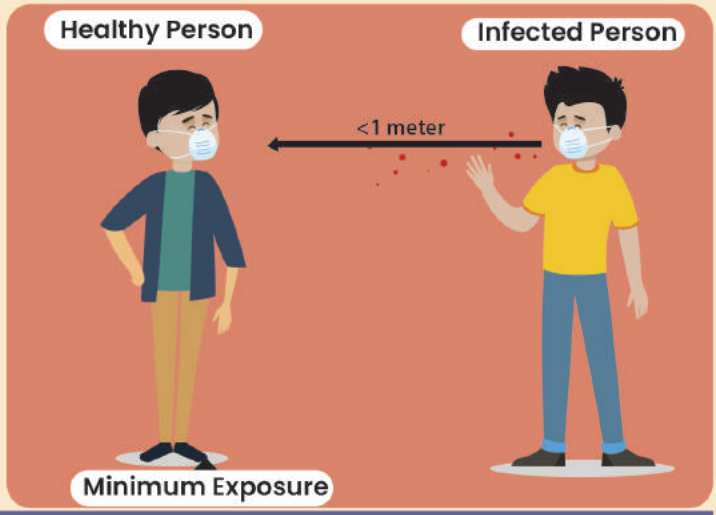
($PM_{2.5}$ 61-120 µg/m^3 or PM_{10} 101-350 µg/m^3)

- Heavy fines for garbage burning 
- Mechanized sweeping on roads with heavy traffic & water sprinkling 
- Enforce pollution control regulations in brick kilns & industries 
- Strictly enforce a ban on firecrackers 

SIMPLE ACTIONS FOR CORONA PREVENTION

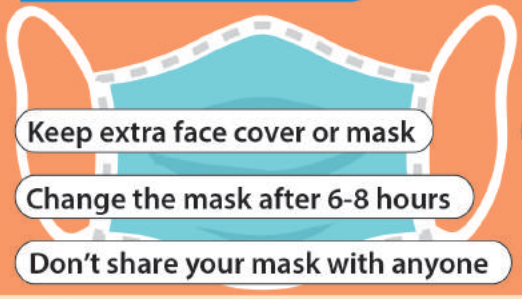
Maintain respectful distance of 1.5 meter & wear mask. It reduces the risk of exposure from the asymptomatic person & also minimises air pollution exposure



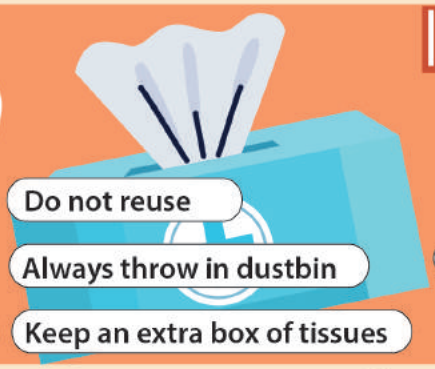


Wearing properly fitted mask or facecover prevents exposure to coronavirus & air pollutants

BEST PRACTICES



- Keep extra face cover or mask
- Change the mask after 6-8 hours
- Don't share your mask with anyone



- Do not reuse
- Always throw in dustbin
- Keep an extra box of tissues

COUGH ETIQUETTE

- Cover your face with tissue

OR

- Elbow while coughing or sneezing

COVID-19 APPROPRIATE BEHAVIOUR

LET'S GET THE VACCINE

This booklet describes the impact of air pollution on COVID-19 & the preventive measures. It will help public to take adaptive measures to protect from impacts of air pollution & COVID-19.

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