



Government of India

National Programme on Climate Change and human Health  
MoHFW

## ADVISORY ON AIR POLLUTION AND HEALTH



### What is Air Pollution?

Air pollution is the contamination of indoor or outdoor air by a range of gasses and solid particles that modify natural characteristics of air we breathe. Key health harmful pollutants include particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>), carbon monoxide (CO), ozone (O<sub>3</sub>), black carbon (BC), sulfur dioxide and nitrogen oxides (Nox). Air pollution is often not visible to the naked eye as the sizes of the pollutants are smaller than the human eye can detect.

### What are major sources of Air Pollution?

Ambient (outdoor) air pollution is caused by factors such as vehicular exhaust, road dust, construction dust, burning of garbage, burning of agricultural crop residues, industrial emissions, fossil fuel fired thermal power plants and brick kilns, burning of biomass in households, burning of firecrackers etc.

Household air pollution is caused by burning biomass such as wood, coal, dung, kerosene in chulhas or fireplaces for cooking and heating purposes. Indoor air pollution is caused by burning mosquito coils, incense sticks, cigarettes, bidis, use of sprays, solvents, and fumes from chemicals used in building interiors etc.

### Air Quality

Air Quality Index (AQI) is a tool based on ambient concentration values of air pollutants and is categorized as Good, Satisfactory, Moderately polluted, Poor, Very Poor, and Severe. Worsening of Air Quality Index especially when in range of 'poor to severe' in an area may result in increase in morbidity and mortality among the exposed people.





Air Quality Index (AQI)# (Pollution level)	Possible Health Consequences	Advice for	
		General Population	Vulnerable Population*
<b>Good (0-50)</b>	Low risk	No special precautions	No special precautions
<b>Satisfactory (51-100)</b>	Minor breathing discomfort in vulnerable population*	No special precautions	Do less prolonged or strenuous outdoor physical exertion
<b>Moderate (101-200)</b>	Breathing or other health related discomfort in vulnerable population*	Do less prolonged or strenuous outdoor physical exertion	Avoid prolonged or strenuous outdoor physical exertion
<b>Poor (201-300)</b>	<ul style="list-style-type: none"> <li>- Breathing discomfort in healthy people on prolonged exposure</li> <li>- Breathing or other health related discomfort in vulnerable population* on short exposure</li> </ul>	Avoid outdoor physical exertion	Avoid outdoor physical activities
<b>Very Poor (301-400)</b>	<ul style="list-style-type: none"> <li>- Respiratory illness in healthy people on prolonged exposure</li> <li>- Pronounced respiratory or other illnesses in vulnerable population* on short exposure</li> </ul>	Avoid outdoor physical activities, especially during morning and late evening hours	Remain indoors and keep activity levels low
<b>Severe (401-500)</b>	<ul style="list-style-type: none"> <li>- Respiratory illness in healthy people on prolonged exposure</li> <li>- Serious respiratory or other illnesses in vulnerable population* on short exposure</li> </ul>	Avoid outdoor physical activities	Remain indoors and keep activity levels low

\* Vulnerable population (high risk): Elderly, children under 5 years, pregnant women, pre-existing illnesses like asthma and other airway or lung (respiratory) and heart (cardiovascular) diseases

#AQI= Air Quality Index; daily AQI is available on websites

1. CPCB ([https://app.cpcbcr.com/AQI\\_India/](https://app.cpcbcr.com/AQI_India/)) or

2. MAPAN-SAFAR: <http://safar.tropmet.res.in/>

## Health consequences of Air pollution





The health impacts of air pollution depend on the level of pollution & exposure duration. The individuals' vulnerability to the health impacts of pollution can also differ based on demographic factors and predisposing health conditions.

Short-term high-level exposures can result in acute health reactions such as irritation to eyes, nose, and throat, along with coughing, wheezing, chest discomfort and acute upper respiratory infections. Vulnerable groups can experience more severe effects such as lower respiratory tract inflammation and infection, exacerbation of asthma, bronchitis or exacerbation of chronic illnesses such as chronic obstructive pulmonary disease, ischaemic heart disease, and cerebrovascular stroke. Long term exposures to even lower level of pollution can result in chronic illnesses of respiratory and cardiovascular systems, lung cancer and premature death.

## Vulnerable Population

Following people may be considered vulnerable to health consequences of air pollution –

1. **Age group** - Individuals who are under five aged children and in old age.
2. **Pregnant Women**-Exposure during pregnancy may have consequences for child in womb.
3. **Predisposed health or medical conditions** - Those with pre-existing illnesses of respiratory and cardiovascular system etc. are at high risk.
4. **Low socio-economic conditions** – Those with poor nutritional status and those living in conditions of poor housing, using fossil fuels for cooking, heating and lighting purposes have high risk.
5. **Occupational group** – Those with possibility of prolonged exposures such as traffic policemen, traffic volunteers, construction workers, road sweepers, rickshaw pullers, auto-rickshaw drivers, roadside vendors, and others working outdoors in polluted settings are at high risk. Women burning biomass for cooking, and sweeping dust are vulnerable on account of their household work.

## Recommendations for State Health Department

- A. State authorities need to keep a check on Air Quality Index data, available at CPCB and MAPAN-SAFAR website or obtain the same from State Pollution Control Board



## B. Strengthening of Healthcare services

### 1. Surveillance and Monitoring:

- Initiate and establish sentinel surveillance of acute illnesses attributed to air pollution in the high polluted cities of the state where not yet done. Record and monitor acute respiratory or coronary events at emergency units of few sentinel hospitals of each city.
- Monitor this against daily AQI levels reported for the cities. Document and maintain statistics of illnesses and their mortality known to be related to air pollution. Statistics should be compiled by healthcare facilities and by cities and to share with NPCCHH programme division at NCDC at email: [npcchh@gmail.com](mailto:npcchh@gmail.com)
- Identify the hot spots by AQI levels and density of vulnerable population and ensure adequate access for them to essential healthcare services.

### 2. Develop health action plan for air pollution and health as a priority:

- Identify State and District/City Nodal Officer for Climate Change and Health related services where not yet identified as a priority who would develop and execute air pollution related health services
- Identify State and District/City Task Force for Climate Change and Health who would provide technical guidance to Nodal officer in air pollution related health services in developing the action plan as a priority.
- Develop State Action Plan on Climate Change and Health, including sub-plans for Districts/Cities, which also has a section on air pollution and health related activities
- The Health Action Plan for state/district/cities will include
  - i. Documentation of month-wise average air pollution levels recorded in districts/cities
  - ii. Documentation of the vulnerable population in districts/cities.
  - iii. List of operational agencies and stakeholders in districts/cities related to air pollution and associated illnesses.
  - iv. List of available healthcare infrastructure and services available in districts/cities for air pollution associated illnesses.
  - v. Documentation of month-wise average statistics of diseases related to air pollution for districts/cities.



- vi. Strategies to integrate air pollution data with disease surveillance data.
- vii. Details of hot spots based on pollution levels and population vulnerability, and plan for appropriate healthcare services in hot spot localities.
- viii. Roles and responsibilities identified for stakeholders in districts/cities.
- ix. Standard procedures for operational co-ordination among local government and stakeholders.
- x. Identified risk reduction activities in districts/cities.
- xi. List of available resources to handle air pollution and health related issues by districts/cities.
- xii. Details of planned awareness and capacity building activities (IEC, advisories, training).
- xiii. Details of plans to make healthcare institutions environment friendly
- xiv. Details of responsibilities of healthcare facilities towards
  - a. Data surveillance
  - b. Response to address increase burden of illness
  - c. Logistics required at health care facilities
  - d. Preparedness of health personnel
  - e. Develop operational communication channel
  - f. Promote clean air by controlling waste incineration, use of diesel generators, use of vehicles non-compliant to vehicle emission standards
- xv. Sharing of this document plan with NPCCHH programme division at NCDC at email: [npcchh@gmail.com](mailto:npcchh@gmail.com)

### 3. Generate awareness to prevent unhealthy effects of Air Pollution:

- General Population:

Reduce risk from exposure to air pollutants by followings-

- Avoid places with high pollution like roads with slow & heavy traffic, areas near polluting industries, construction-demolition sites, coal based power plants and brick kilns etc.
- Reschedule outdoor activities as per AQI level, and remain indoors on days with poor to severe AQI.
- On days with poor to severe AQI, avoid outdoor morning and late evening walk, run, jog and physical exercise. Do not open external doors and



windows during morning and late evening hours, may ventilate if necessary between 12 p.m. to 4 p.m. in afternoon.

- Avoid burning biomass such as wood, coal, animal dung, kerosene. Use clean smokeless fuels (gas or electricity) for cooking and heating purposes. If using biomass, use clean cook stoves.
- Avoid burning firecrackers.
- Avoid burning in open any form of wood, leaves, crop residues, and waste.
- Do not smoke cigarettes, bidis and related tobacco products.
- Avoid burning mosquito coils and incense sticks in closed premises.
- Practice wet mopping instead of sweeping or vacuum cleaning inside homes. If you choose to use vacuum cleaner, use those which has High Efficiency Particulate Air (HEPA) filter.
- Keep washing your eyes with running water regularly and do regular gargles with warm water.
- Consult the nearest doctor in case of breathlessness, giddiness, cough, chest discomfort or pain, irritation in eyes (red or watery).
- As a “no-regret” strategy, healthy diet, with fruit and vegetables rich in antioxidants, and adequate amount of hydration by drinking water is advocated.

- **Vulnerable Population – additional measures**

Patients with underlying medical conditions such as chronic pulmonary or cardiovascular problems etc. should

- Be more careful to avoid exposure to air pollution.
- Avoid any strenuous activity if AQI levels are poorer
- Keep a check on exacerbations of symptoms during poorer AQI levels
- Properly follow personal doctor's instructions on healthcare.
- Keep their prescribed medications readily available.
- Seek immediate medical advice if symptoms worsen.

- **Optional choice:**

- If you choose to use face mask, the disposable N95 or N99 is useful provided user instructions are followed. These masks may help provided the period of exposure is short. Masks should have proper fitting on users' mouth and nose.



Ensure to replace the masks after usage as instructed. Paper masks, handkerchiefs, scarves and cloth are not effective.

- If you choose to use air purifier, follow manufacturers' guidelines. Ensure to replace and clean filters as instructed. Avoid using an air purifier that works by generating ozone, as it increases pollution inside rooms.
- When operating air conditioners in buildings or vehicle, use in “re-circulate” mode to avoid contact with outside air.

#### ● Air Pollution and COVID-19

- Air Pollution can affect COVID-19 infection and its outcome.
- Air pollution has a positive impact on the transmission of and infection by COVID-19
- Air pollution, and particularly PM2.5 concentrations can increase the hospital admissions and deaths among Covid-19 cases
- Priority health action plans and measures must be in place to protect, prevent and control from air pollution among the COVID-19 cases
- Strict COVID-19 guidelines including wearing mask, social distancing, hand washing, crowd avoidance etc. must be in place in more air polluted areas/cities.

## For further information, please visit:

- [http://www.searo.who.int/india/topics/air\\_pollution/en/](http://www.searo.who.int/india/topics/air_pollution/en/)
- <http://www.who.int/airpollution/en/>
- <http://cpcb.nic.in/National-Air-Quality-Index/>
- [http://cpcb.nic.in/cpcb/old/AQI\\_new.php](http://cpcb.nic.in/cpcb/old/AQI_new.php)
- <http://envfor.nic.in/content/download-green-good-deed-audio-visual-creatives>
- <https://www.unenvironment.org/explore-topics/air>

