

DOCTORS
FOR CLEAN AIR
AND CLIMATE ACTION



Clean Air Prescription

A Toolkit

**for Healthcare Professionals
To Lead The Way for Clean Air
And A Healthy India**



**LUNG CARE
FOUNDATION**

Contents

Acknowledgements	1
Why Health Professionals Must Advocate for Clean Air	3
Introduction to Doctors for Clean Air & Climate Action	4
Section 1: What is Air Pollution & how does it impact our health?	5
Understanding Air Pollution	6
Air Quality Index	8
The Toll of Air Pollution on Health	9
Health Impacts of Air Pollution	9
Short-Term Health Impacts	9
Long-Term Health Impacts	9
How air pollution is impacting children across India	10
Health Co-Benefits of Clean Air	11
Section 2: The Powerful Role YOU Can Play	12
Effective Communication Strategies on Air Pollution	13
What can YOU do in the fight against Air Pollution	14
Minimize Your Own Environmental Impact	15
Empower Your Colleagues	15
Communicate With Your Patients	16
Engage With The Community	16
Engage With The Media	17
Engage With Policymakers	17
Engage Through Research	18
How the DFCA Secretariat can support you	19
Training and Education	19
Collaborate with Medical Associations	19
Communication and Advocacy	20
Engagement with Policymakers	20
Research and Evidence-Based Action	21
Community and Stakeholder Collaboration	21
Air Pollution Fact Sheet	22
Glossary of Key Terms Related to Air Pollution	24

Acknowledgements

This toolkit was made possible through the collaboration and support of several organizations and individuals dedicated to advocating for clean air and public health.

Lung Care Foundation (LCF) - Doctors For Clean Air & Climate Action (DFCA) extends its deepest gratitude to Health Care Without Harm and the Clean Air Fund for their invaluable support and partnership in this initiative.

The toolkit was compiled by Anshika Kansal, with guidance from Dr. Arvind Kumar, Dr. Rajiv Khurana, and Abhishek Kumar. Their expertise, along with the support of the LCF-DFCA team, was instrumental in shaping this resource.

This toolkit is the culmination of a rigorous literature review and a series of comprehensive consultations with its end users, ensuring that it meets the needs of health professionals committed to clean air advocacy.

Thank you to everyone who contributed to this endeavor. Your commitment to advancing health and environmental justice is greatly appreciated.

Team Lung Care Foundation

Dr. Arvind Kumar, Founder Trustee

Dr. Rajiv Khurana, Founder Trustee

Dr. Belal Bin Asaf, Founder Trustee

Abhishek Kumar, CEO & Founder Trustee

Dr. Carmin Uppal, Deputy Director

Dr. Ridima Kamal, Deputy Manager – DFCA

Anshika Kansal, Assistant Manager – DFCA

Hamid Rehman, Senior Manager – Communications

Shirin Kaul, Assistant Manager – Communications

Ashok Mishra, Senior Manager – Admin and Accounts

Neha Kashyap, Assistant Manager – Information Services

Air Pollution Is A Silent Killer



Healthy Pink Lung



Lungs of a 40 Year-Old Non-Smoker Living in a Polluted City



Lungs of a 14 Year-Old Boy Living in a Polluted City

Air pollution is a major threat to future generations. It caused over 8.1 million deaths globally in 2021, making it the second largest risk factor for deaths. In India alone, air pollution accounts for more than 2.5 million premature deaths each year. It significantly reduces life expectancy and imposes an economic burden of over \$150 billion or ₹12,58,038 crores annually.

Air pollution poses a devastating threat to human health from before birth through adulthood. Harmful particles can cross the placenta, leading to congenital defects, preterm births, and low birth weights. In infancy and early childhood, air pollution increases the risk of bronchiolitis, pneumonia, asthma, and stunted brain and lung development. As children grow, their vulnerability

continues, with higher risks of cognitive impairments and developmental delays. In adulthood, long-term exposure contributes to respiratory infections, heart disease, stroke, lung cancer, COPD, and weakened immune systems, making air pollution a pervasive, lifelong threat to health. Vulnerable populations, including children, the elderly, and those with preexisting health conditions, are worst affected.

It is crucial to recognize that

air pollution is a health issue, not just an environmental one.

Why Health Professionals Must Advocate for Clean Air

As healthcare professionals (HCPs), you witness firsthand the devastating effects of air pollution on your patients. Your unique position allows you to advocate effectively for clean air, influencing public awareness and policy change. You are trusted figures in society, and your commitment to health and well-being makes you powerful advocates for change.

By advocating for clean air, you protect your patients' health and drive systemic change that benefits entire communities. Imagine the impact you can make by raising awareness, educating peers and the public, and engaging with policymakers.

As motivated motivators, your advocacy can lead to cleaner air and healthier lives.

This toolkit **provides the knowledge, resources, and strategies you need to become a powerful advocate for clean air and climate action**. Through education, you'll empower patients, colleagues, policymakers, and the public to understand the health impacts of air pollution.



Use this toolkit to:



Communicate health impacts effectively.



Inspire community action for cleaner air.



Raise public awareness about the health emergency posed by air pollution.



Engage in policy advocacy to influence stricter air quality regulations.

You are crucial changemakers in India. Your leadership through Doctors For Clean Air & Climate Action (DFCA) will inspire many healthcare professionals and members of society. This toolkit is a ready reference on clean air, climate action, and health. Please use it to guide your advocacy and share it with your colleagues. Your motivation inspires others, and together, we can achieve a cleaner, healthier future.

When HCPs advocate for clean air, it's more than environmentalism; it's a commitment to preventive care and overall well-being. This leadership inspires others to join the fight, creating a healthier environment for all.

Introduction to Doctors For Clean Air & Climate Action

Doctors for Clean Air and Climate Action (DFCA) is a nationwide network of passionate and informed doctors committed to working for the cause of clean air and climate action. It envisions access to clean air for all.

Doctors for Clean Air and Climate Action (DFCA) aims to Engage, Educate and Support the network of doctors to fulfil the following key objectives:



AWARENESS

Doctors must enlighten the general public about the severe consequences of Air Pollution and its detrimental health impacts.



AWAKENING

Citizens and leaders must understand the serious threat of air pollution to health.



ACTION

Doctors influence citizens, administrators, and policymakers for immediate and stringent measures to ensure clean air for all.

An Initiative of:

Lung Care Foundation, established on May 25, 2015, as a registered not-for-profit organisation, is dedicated to promoting 'Lung Health' in India. Our vision is 'Care & Cure of 2.9 Billion Lungs in India' by preventing lung diseases through advocating for lung health awareness, conducting impactful research and policy monitoring on air pollution, and building capacity by refining skills and lifestyle habits to address the growing incidence of lung diseases.

Supported by:

Health Care Without Harm (HCWH) is an international NGO that works to transform healthcare worldwide and reduce its environmental footprint by becoming a community anchor for sustainability and a leader in the global movement for environmental health and justice. With regional offices in 4 continents and partners around the world for global and regional initiatives, Health Care Without Harm is leading the global healthcare sustainable movement.

Clean Air Fund (CAF)

Clean Air Fund (CAF) funds and partners with organisations across the globe that promote air quality data, build public demand for clean air, and drive action. They influence and support decision makers to act on air pollution. They are helping to build a movement that accelerates action on clean air. All over the world, they have led or funded projects that drive meaningful policy change.

SECTION 1

What is Air Pollution and How Does It Impact Our Health?

In this section, we examine the vital importance of clean air for public health and the unique role healthcare professionals have in advocating for it. You'll learn about:

- The different types of air pollution and their sources
- How air pollution uniquely impacts children and their health
- The devastating health impacts of polluted air
- Health Co-Benefits of Clean Air

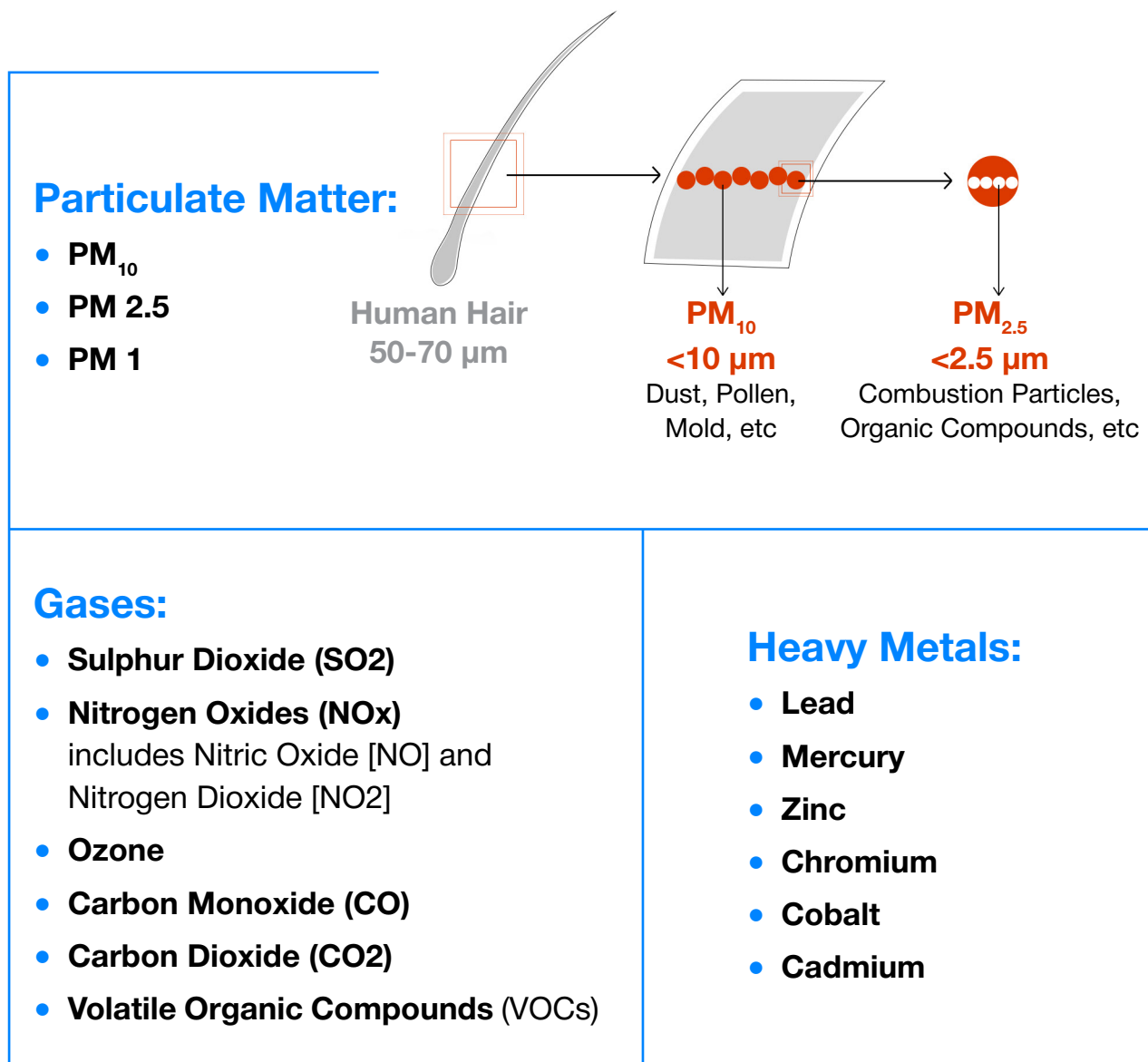


Understanding Air Pollution

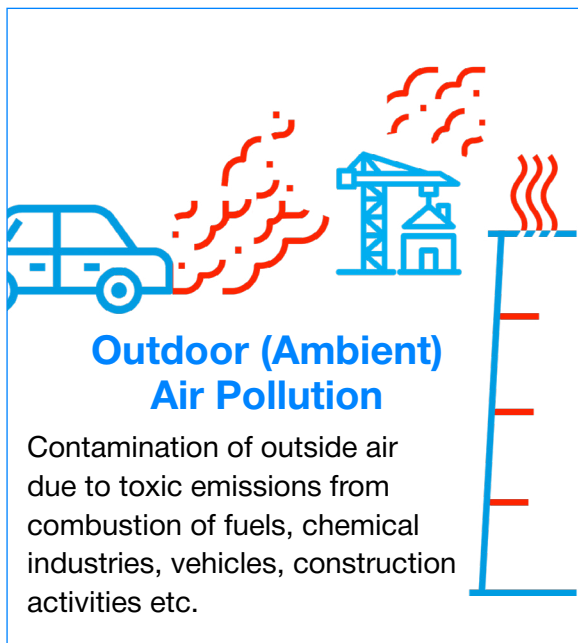
Air pollution by definition refers to the presence of undesirable components (above the set limits) that contaminate the air and are detrimental to human health, ecosystem or planet as a whole. These pollutants can cause a range of health issues and environmental problems, affecting everyone, especially the most vulnerable populations like children, the elderly, and those with preexisting health conditions.

Types of Pollutants

Pollutants can be particulate matter, gases, and heavy metals. Origin of these air pollutants can be natural or man-made.



Types of Air Pollution



Outdoor (Ambient) Air Pollution

Contamination of outside air due to toxic emissions from combustion of fuels, chemical industries, vehicles, construction activities etc.



Indoor (Household) Air Pollution

Contamination of the air inside homes and buildings from compounds such as smoke, CO, dust, formaldehyde, asbestos, pesticides, lead, cleaning solvents, chloroform etc. Indoor air pollution is 5-10 times more harmful than outdoor air pollution.

Major Pollutants

Particulate Matter (PM 2.5 as well as PM 10), Ground-level ozone, Nitrogen Dioxide (NO₂), Sulfur Dioxide (SO₂), Carbon Monoxide (CO)

Sources

Industrial Emissions, Vehicle Emissions, Agricultural Activities (Crop Residue Burning, Fertilizers and pesticides), Natural Sources (Wildfires, dust storms)

Major Pollutants

Particulate Matter (PM 2.5 as well as PM 10), Volatile Organic Compounds (VOCs), Carbon Monoxide (CO), Radon, Biological Pollutants (Mold, dust mites, pet dander, and other allergens and pathogens)

Sources

Residential Biomass Burning (Cooking and Heating), Tobacco Smoke, Household Products (Cleaning agents, paints), Building Materials (Asbestos, formaldehyde, and lead), Biological Pollutants


Doctors and healthcare professionals must understand outdoor and indoor air pollution sources and types. Recognizing these factors enables better diagnosis and treatment of patients affected by air pollution and supports advocacy for policies and practices that reduce exposure to these harmful pollutants.

Air Quality Index

AQI is a measure of the level of air pollution, which takes into consideration the levels of 8 major pollutants (PM₁₀, PM_{2.5}, NO₂, SO₂, CO, O₃, NH₃, Pb) in the area. It is a figure derived from a formula that takes into account the levels of all these 8 major pollutants in accordance with their importance and contribution towards the air quality. Since AQI incorporates multiple air pollutants, it offers a more comprehensive picture of air quality compared to PM_{2.5} or any other pollutant level alone.

The Air Quality Index (AQI) simplifies complex air pollution data into an easy-to-understand number, colour code, and health risk information. As AQI rises (worse air quality), health risks, especially for vulnerable populations, increase.

AQI levels and Health Effects



Good (0-50)	Low risk
Satisfactory (51-100)	Minor breathing discomfort in vulnerable population
Moderate (101-200)	Breathing or other health related discomfort in vulnerable population
Poor (201-300)	Breathing discomfort in healthy people on prolonged exposure Breathing or other health related discomfort in vulnerable population on short exposure
Very Poor (301-400)	Respiratory illness in healthy people on prolonged exposure Pronounced respiratory or other illnesses in vulnerable population on short exposure
Severe (401- 500)	Respiratory illness in healthy people on prolonged exposure Serious respiratory or other illnesses in vulnerable population on short exposure

A comparison of WHO and Indian Air Quality Standards:

Pollutants	PM _{2.5} (in µg/m) ³ (Annual Averaging Time)	PM ₁₀ (in µg/m) ³ (Annual Averaging Time)	NO ₂ (in µg/m) ³ (Annual Averaging Time)	SO ₂ (in µg/m) ³ (24-h Averaging Time)	Ozone (in µg/m) ³ (8-h Averaging Time)
WHO Standards	5	10	10	40	100
Indian Standards	40	60	40	50	100

The Toll of Air Pollution on Health

Air pollution is a major environmental health risk, affecting individuals across all demographics. It has both immediate and long-term effects on health, contributing to a variety of diseases and conditions. The severity of these impacts depends on the type of pollutants, duration of exposure, and individual susceptibility.

Short-Term Health Impacts

Short-term exposure to air pollution can lead to immediate health effects, especially in vulnerable populations such as children, the elderly, and those with preexisting health conditions.

Long-Term Health Impacts

Long-term exposure to air pollution has more severe and chronic health effects. These impacts can develop over the years and significantly reduce life expectancy and quality of life.

Headaches and Dizziness
Nausea



Eye and Skin Irritation



- Eye Irritation
- Skin Issues

Cardiovascular Effects



- Increased Heart Rate and Blood Pressure
- Heart Attacks

Respiratory Symptoms



- Irritation of the Airways
- Asthma Exacerbation



Neurological Effects

- Cognitive Decline
- Mental Health Issues
- Stroke



Cardiovascular Effects

- Heart Disease



Chronic Respiratory Diseases

- Chronic Obstructive Pulmonary Disease
- Lung Cancer



Immune System Effects

- Weakened Immune Response
- Autoimmune Diseases



Metabolic and Endocrine Effects

- Diabetes
- Obesity



Reproductive and Developmental Effects

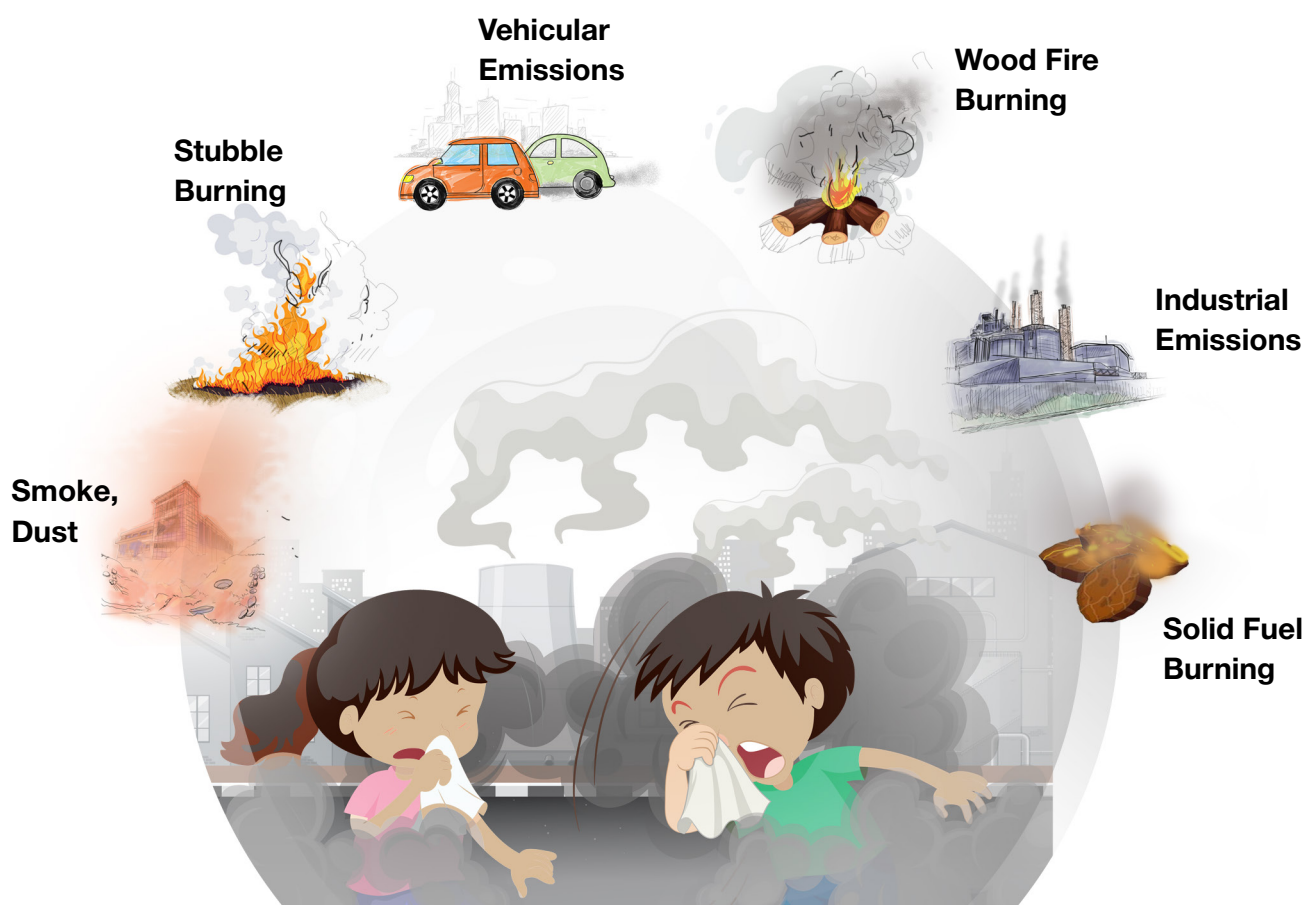
- Adverse Pregnancy Outcomes
- Impact on Child Development

Percentage of deaths (by Cause) due to Air Pollution in 2021

Stroke	39%
Lung Cancer	31%
Heart Disease	38%
COPD	67%
Neonatal	33%

How Air Pollution is Impacting Children Across India

Children are especially vulnerable to the harmful effects of air pollution, which can have lifelong consequences. From a young age, they inhale more air per kilogram of body weight and absorb more pollutants than adults, while their developing bodies are less capable of filtering out harmful substances. Close to the ground, children are exposed to more ground-level pollution, which can lead to inflammation and blockages in their smaller airways. As they grow, ongoing exposure during critical developmental periods increases the risk of respiratory infections, asthma, impaired cognitive development, and even chronic conditions like high blood pressure, diabetes, and obesity. This early exposure sets the stage for long-term health challenges, making air pollution a pervasive threat to children's immediate and future well-being.



The simple act of breathing has devastating health impacts on our children

You see the toll daily—air pollution etched on your patients' faces. The good news? **Clean air is within reach!** You are uniquely positioned to fight back. Educate your patients, advocate for change, and become architects of a healthier future. Let's turn your dismay into action. Together, we can demand clean air for all. You lead the charge, and we stand beside you. The change starts now.

Health Co-Benefits of Clean Air

Health co-benefits refer to the additional positive health outcomes gained from improving air quality. By curbing harmful emissions from vehicles, industries, and other pollution sources, we can unlock a range of interconnected health, economic, and environmental benefits. Acting today to improve air quality will not only save lives now but also protect future generations from the devastating health impacts of pollution.

Key Health Co-Benefits

- Cleaner air reduces the need for costly pollution control measures, freeing up resources for sustainable development and health-promoting investments.
- Reducing pollutants enhances public health and increases crop yields, contributing to greater food security and reduced malnutrition.
- Cleaner air reduces the incidence of air pollution-related diseases such as stroke, heart disease, lung cancer, and respiratory conditions, saving lives and improving overall health.
- Cleaner air leads to fewer hospital visits and medical expenses, with significant improvements in overall well-being and quality of life.
- Cleaner air can also substantially reduce the premature mortality rates.
- Cleaner air results in fewer sick days, strengthening the labour market, increasing productivity, and boosting the country's economy by maintaining a healthier workforce. The long-term economic benefits of moving towards cleaner air far outweigh the costs of implementing these changes.

It is clear that the economic and health benefits of addressing air pollution today will safeguard future generations and ensure a more sustainable and prosperous future.



SECTION 2

The Powerful Role You Can Play

This section empowers you to take action as a clean air advocate by providing strategies, tools, and resources to drive meaningful change. You'll find:

- Effective communication strategies to raise awareness about air pollution
- Actions to reduce your environmental footprint and advocate for clean air policies
- Support from the DFCA Secretariat: Expert guidance, training, and resources to help you lead clean air initiatives in your community.

Effective Communication Strategies on Air Pollution

Public health communication thrives on building narratives. It compels people to change their behaviour, fosters trust, and empowers communities to act for a healthier future.

This section equips you with key pointers for crafting impactful public health communication.

Personalize and Localize

Connect with your people emotionally by sharing real stories of patients affected by air pollution and using local air quality data. By making the issue tangible and directly relevant to your community, you help people understand the personal impact of air pollution on their lives and surroundings.

Create a Sense of Urgency and Empower Action

Emphasize the positive outcomes of clean air, such as improved health and reduced healthcare costs, while offering practical steps individuals can take to reduce their impact on air pollution. Encourage immediate action and advocacy for change to motivate your community to get involved.



Dr. Arvind Kumar urges immediate action for clean air at COP-28.

Leverage Visuals and Digital Platforms

Use visual storytelling through pictures, charts, infographics, and maps to make air quality issues more accessible and engaging. Utilize social media platforms to spread this information, spark conversations, and mobilize public support for cleaner air initiatives.

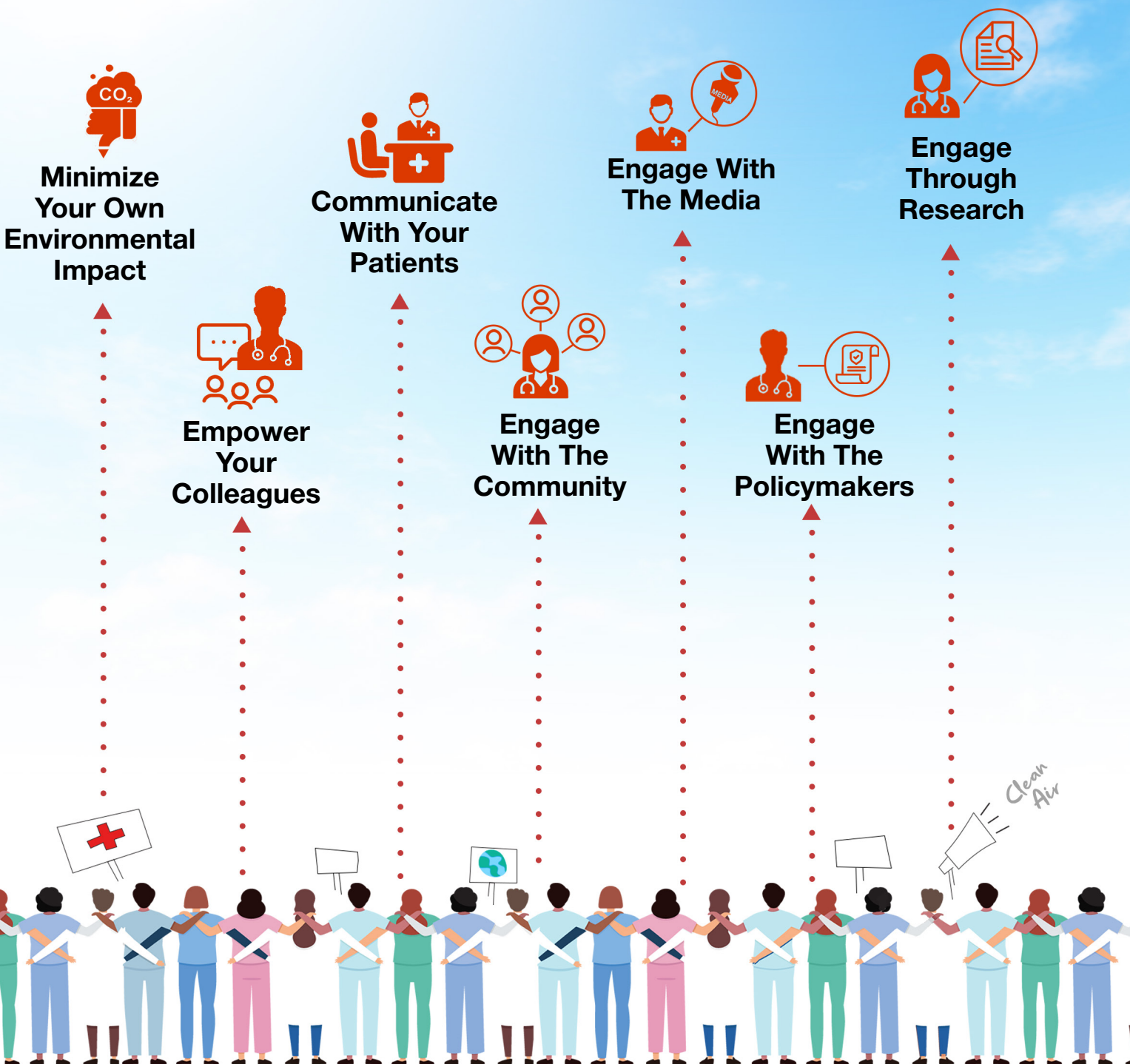
Patients trust your expertise.

Leverage that trust to empower them to fight for clean air.

Together, your voices become a powerful antidote to a toxic future.

What Can YOU Do In The Fight Against Air Pollution

7 Ways to drive Change





Minimize Your Own Environmental Impact

- 1. Prioritize Active Transportation and Public Transit:**
 - Opt for walking, cycling, or using public transportation to reduce your carbon footprint and minimize transportation-related emissions.
- 2. Consider Fuel-Efficient or Electric Vehicles:**
 - When selecting a car, choose fuel-efficient vehicles or explore electric alternatives to minimize environmental impact and potentially save on costs.
- 3. Embrace Energy-Efficient Practices:**
 - Use energy-efficient appliances and lighting in your home and office to conserve resources.
 - Implement energy-saving practices such as turning off lights and equipment when not in use.
- 4. Reduce Waste:**
 - Implement a waste reduction strategy by focusing on reducing, reusing, and recycling.
 - Choose sustainable products whenever possible to promote long-term resource sustainability.

Empower Your Colleagues



- 1. Organize Educational Events:**
 - Arrange regional seminars and workshops on air pollution in India to educate and empower your colleagues.
- 2. Incorporate Air Pollution Exposure in Medical History:**
 - Advocate for the inclusion of air pollution exposure in patient medical histories to better understand and address related health issues.
- 3. Promote Local Research:**
 - Encourage doctors to conduct local research studies on air pollution, climate change, and health to build a body of evidence and inform practices.
- 4. Communicate with Medical Associations:**
 - Reach out to the medical fraternity, including National Medical Associations, through mass communication to highlight the health emergency and seek their commitment to action.
- 5. Disseminate Informative Materials:**
 - Share educational materials that highlight the health impacts of air pollution and climate change with your colleagues.



Communicate With Your Patients

1. Increase Awareness:

- Discuss the health impacts of air pollution and climate change with patients during consultations.
- Display posters in clinics and hospitals to highlight health impacts and preventive actions.
- Install Air Quality Index (AQI) monitors in waiting rooms to increase patient awareness.
- Incorporate air-purifying plants in waiting areas with messages promoting their use at home.
- Participate in patient education programs and community camps to raise awareness about health risks linked to air pollution and climate change.

2. Encourage Lifestyle Changes:

- Promote the use of carpooling and public transport to reduce vehicular air pollution.
- Encourage the incorporation of indigenous air-purifying plants to enhance greenery.
- Advocate for efficient waste management, emphasizing the avoidance of plastics.
- Raise awareness about the health impacts of burning fossil fuels and promote the use of clean cooking fuels.



Engage With The Community

1. Engage with Schools:

- Participate in seminars and workshops in schools to educate the next generation about air pollution, climate change, and their health impacts.
- Encourage students to form environmental clubs focused on air pollution, climate change, and mitigation strategies.
- Advocate for schools to implement asthma management protocols.
- Share educational materials and resources on air pollution and climate change with school communities.

2. Engage with the Public:

- Create informative videos in regional languages addressing air pollution's health effects and symptoms, busting myths, and eliciting public commitment for individual solutions.
- Establish low-cost air monitoring systems in cities, clinics, and schools to educate people about air quality and issue health advisories.
- Collate medical data to highlight the correlation between air pollution, climate change, and health, and publish research findings for wider public awareness.

- Actively engage on social media platforms (Facebook, Instagram, YouTube, Blogs) to spread awareness about air pollution, climate change, and individual actions.
- Participate in community movements (tree plantation drives, sustainable living workshops, cycle rides, health camps) and clubs (Rotary Club, Lions Club, etc.) to promote clean air and a healthier environment.
- Encourage the planting of indigenous tree species and air-purifying plants to increase green cover and improve air quality.



Engage With The Media

1. Raise Awareness:

- Write articles, opinion pieces, and blogs about the health impacts of air pollution.
- Participate in interviews and discussions on radio, television, and social media to raise awareness.

2. Share Success Stories:

- Highlight successful initiatives and case studies of improved air quality.
- Use social media platforms to share information and engage with the public.

3. Create Educational Content:

- Develop and share infographics, videos, and other multimedia content to explain the dangers of air pollution and the benefits of clean air.



Engage With Policymakers

1. Advocate for Change:

- Meet with local, state, and national policymakers to discuss the importance of air quality regulations.
- Support policies aimed at reducing emissions from industrial and transportation sources.

2. Provide Expert Testimony:

- Offer to speak at public hearings and provide evidence-based testimony on the health impacts of air pollution.
- Participate in advisory boards and committees focused on environmental health.

3. Collaborate on Policy Development:

- Work with policymakers to develop and implement effective air quality standards.
- Provide input on legislation and regulations to ensure they adequately protect public health.



Engage Through Research

1. Conduct Studies:

- Initiate or participate in research studies that examine the health impacts of air pollution.
- Publish findings in reputable journals and present at conferences to share knowledge and inform policy.

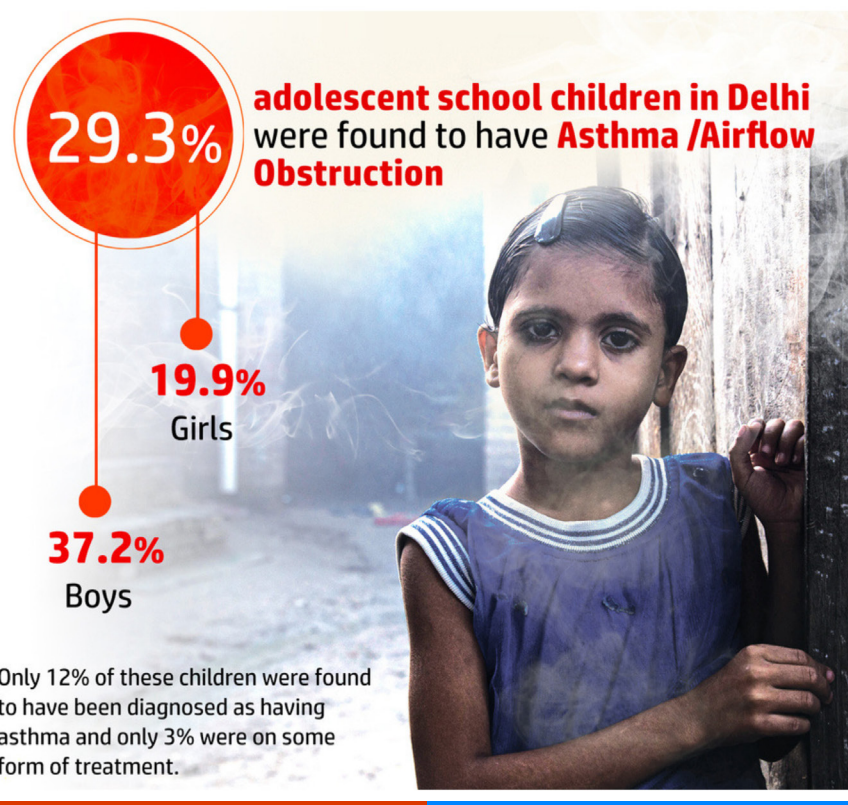
2. Data Collection:

- Collaborate with local and national organizations to collect and analyze air quality data.
- Use this data to highlight areas of concern and advocate for targeted interventions.

3. Promote Evidence-Based Practices:

- Encourage the use of evidence-based practices in mitigating air pollution and its health effects.
- Stay updated with the latest research and integrate findings into clinical practice and advocacy efforts.

By taking these **7 actionable steps**, health professionals can play a vital role in advocating for clean air and protecting public health. Your actions, both big and small, can contribute to a healthier environment and inspire others to join the fight against air pollution.



Findings of the study by LCF that evaluated 3157 adolescent schoolchildren and revealed alarming findings.

How the DFCA Secretariat Can Support You

We would like you to be the leader and lead the fight for clean air in your area. However, we are committed to being your support team, empowering you to lead the action for clean air and better health. By providing comprehensive resources, training, and strategic collaboration opportunities, we aim to equip you with the tools and knowledge needed to advocate effectively for clean air. Here's how we can collaborate:

Training and Education

- **Conduct a webinar on the latest research linking air pollution to respiratory diseases**, including Q&A sessions with experts.
- **Launch an online course** with modules on air quality monitoring, effects on health, and advocacy techniques.
- **Organize interactive workshops for medical students** on the health impacts of air pollution.

Collaborate with Medical Associations

- **Co-build an action agenda** to engage the medical associations' membership on clean air.
- **Conduct sensitisation and capacity building sessions** with medical students associations' and networks to better enable and equip the future healthcare landscape.



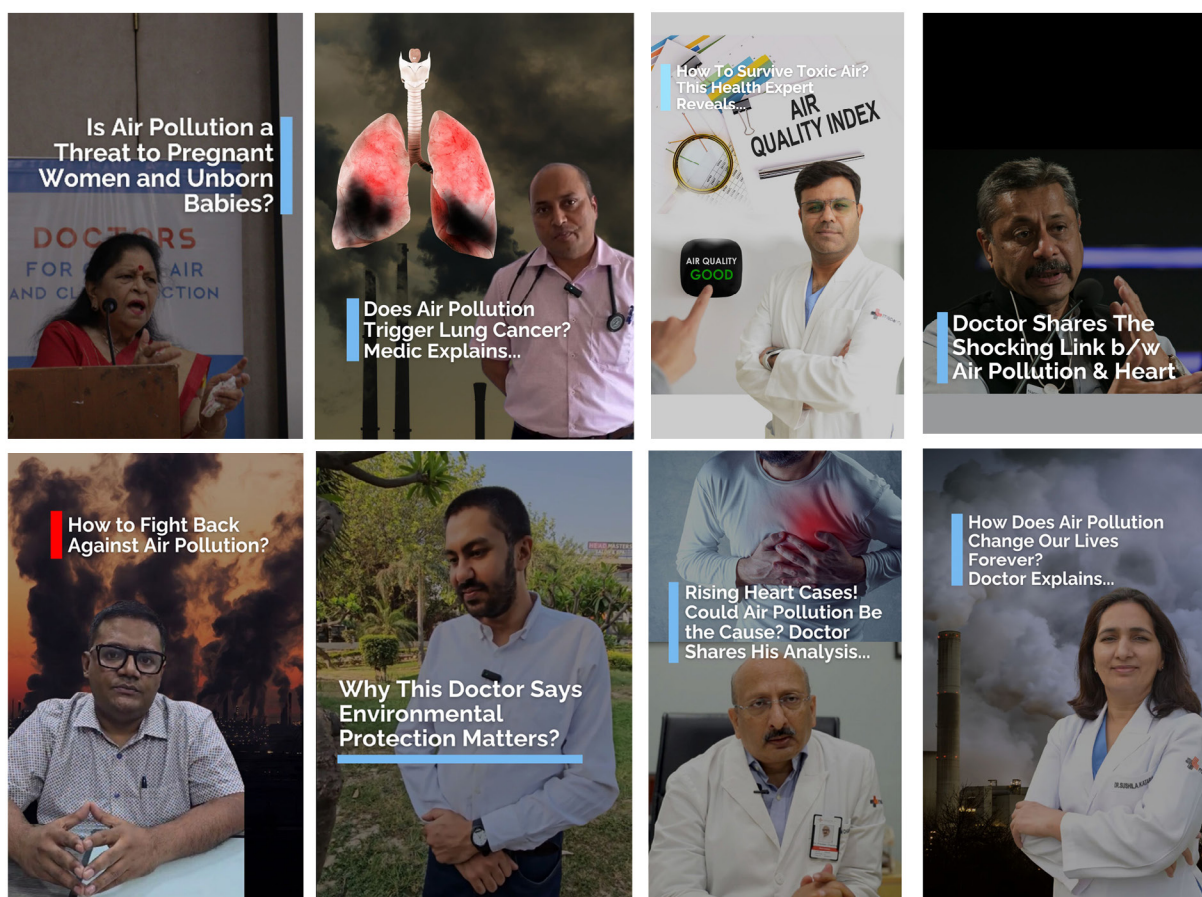
National Medical Associations' Leadership Conclave for Clean Air (NMALCCA) organised by DFCA

Communication and Advocacy

- **Develop and distribute posters** on the health effects of air pollution in clinic waiting areas.
- **Create videos** with Health Professionals to highlight the health impacts of air pollution
- **Host a media workshops** to teach effective storytelling about air pollution and health impacts.

Engagement with Policymakers

- **Arrange meetings with key administrative officers and state health department** representatives to foster dialogue on clean air.
- **Develop training materials for policymakers** to understand and integrate air quality considerations into public health policies.



Videos of DFCA Members highlighting concepts of air pollution and its health impacts

Research and Evidence-Based Action

- **Plan a study on the health impacts of air pollution in a specific city**, presenting findings to the local government.
- **Collaborate with local NGOs to develop a community action plan** to reduce air pollution.

Community and Stakeholder Collaboration

- **Create city forums for clean air** to facilitate inter-sectoral dialogue and community participation to drive local action
- **Organize community health fairs with interactive booths** on air quality and health.



Enabling policymakers and various other stakeholders of the city to drive action through forums for clean air led by the DFCA Members.

Air Pollution

Fact Sheet

This is a compilation of alarming facts about air pollution and its impacts from multiple research studies and reports to strengthen the spirit of inquiry and dissemination efforts.

- Air pollution was the 4th leading risk factor for early death worldwide in 2019, surpassed only by high blood pressure, tobacco use, and poor diet.⁵
- 91% of the world's population lives in places where air pollution levels exceed WHO guideline limits.⁶
- Exposure to fine-particle outdoor air pollution is the largest environmental risk factor for premature death globally.¹¹
- 20 percent of newborn deaths globally are attributed to air pollution exposure.¹¹
- Globally, countries in Asia and Africa experience the highest age-standardized rates of death and DALYs attributable to PM2.5: for example, India (96 deaths/100,000 population); China (81 deaths/100,000); Egypt (157/100,000); Iran (63/100,000); and Nigeria (59/100,000).⁵
- Between 2000 and 2019, while global averages of NO₂ exposure decreased by 5%, South Asia saw a surge of 22%, with India being a prominent contributor. The reliance on fossil fuels for energy production, increased industrial activity, and rise in the number of passenger vehicles over the previous ten years are probably the main causes of this increase.¹²
- From 2013 to 2021, 59.1 percent of the world's increase in pollution has come from India.¹⁴
- 22 of the top 30 most polluted cities globally are located in India.⁷
- In 2023, 90 of the top 100 most polluted districts in the world are all in India.¹³
- According to World Air Quality Report 2023 by IQAir - ¹⁵
 - India is ranked as the world's third most polluted country, with an average annual PM2.5 concentration of 54.4 µg/m³ (more than 10 times the WHO recommended annual guideline level of 5 µg/m³).
 - 9 out of the top 10 most polluted cities in the world are from India.
 - India's air quality deteriorated compared to 2022, and Delhi emerged as the world's most polluted capital city for the fourth consecutive time.
 - Begusarai in Bihar is labelled as the world's most polluted metropolitan area, with an average PM2.5 concentration of 118.9 µg/m³.
 - Around 136 million Indians (96% of the Indian population) face PM2.5 concentrations (seven times) higher than the WHO recommended annual guideline level of 5 µg/m³.

- Over 66% of Indian cities have reported annual averages higher than 35 $\mu\text{g}/\text{m}^3$.
- New Delhi, India, has the highest population-weighted annual average PM2.5 concentration of 92.7 $\mu\text{g}/\text{m}^3$.
- According to the UN Environment Programme, in India, each person's annual mean exposure to fine particle outdoor air pollution is 83 $\mu\text{g}/\text{m}^3$ —16.6 times WHO's guideline. ¹¹
- In 2019, 1.67 million deaths in India were attributable to air pollution, accounting for 17.8% of the total deaths in India, making it the highest health risk in India. Of these, 0.98 million deaths were attributable to ambient particulate matter pollution, 0.61 million to household air pollution, and 0.17 million to ambient ozone pollution.⁵
- Of the total deaths attributable to air pollution in India in 2019, the largest proportions were due to COPD (32.5%) and ischaemic heart disease (29.2%), followed by stroke (16.2%) and lower respiratory infections (11.2%).⁸
- According to State of Global Air Report 2024,
 - Air pollution accounted for nearly 18% of all deaths in India in 2021. Considered separately, outdoor particulate matter (PM) ranked as the second leading risk factor for deaths, and household air pollution (HAP) ranked first.
 - 148 deaths per 100,000 people are due to air pollution in India. This is higher than the global average.
- On average, people in India would live 5.9 years longer if their country met the WHO guidelines.⁸
- The economic effects of air pollution are especially severe in regions like South Asia, where losses are equivalent to 10.3% of GDP.⁹
- The economic loss due to lost output from premature deaths attributable to air pollution in India in 2019 was US\$28.8 billion, and from morbidity attributable to air pollution was \$8.0 billion.¹⁰
- Of the total economic loss of \$36.8 billion attributable to air pollution in India in 2019, 36.6% was from lung diseases, which included COPD (21.1%), lower respiratory infections (14.2%), and lung cancer (1.2%). The rest was from ischaemic heart disease (24.9%), stroke (14.1%), diabetes (8.4%), neonatal disorders (13.3%), and cataract (2.7%).⁸
- The economic loss due to lost output from premature deaths and morbidity attributable to air pollution was 1.36% of India's GDP in 2019.⁸
- The economic loss due to lost output from premature deaths and morbidity attributable to ambient particulate matter pollution and household air pollution as a percentage of GDP in India was 0.84% and 0.49%, respectively, in 2019.⁸

Glossary of Key Terms

This glossary provides a foundational understanding of key terms related to air pollution, helping health professionals communicate effectively and advocate for cleaner air.

Air Pollution	The presence of harmful or excessive quantities of substances in the air, which can include gases, particulates, and biological molecules.
Air-Purifying Plants	Plants that can help remove pollutants from the air and improve indoor air quality.
Air Quality Index (AQI)	A system used to communicate how polluted the air currently is or how polluted it is forecast to become.
Asbestos	A group of minerals that are found in the environment and used in building materials. Asbestos fibers can cause serious health problems, including lung cancer and mesothelioma, when inhaled.
Carbon Monoxide (CO)	A colorless, odorless gas produced by the incomplete combustion of fossil fuels. It can interfere with the body's ability to transport oxygen.
Clean Cooking Fuels	Fuels that produce fewer pollutants when burned, such as electricity, LPG, natural gas, and ethanol.
Environmental Justice	A movement that seeks to address the inequities faced by marginalized communities in relation to environmental hazards and health outcomes.
Ground-Level Ozone	Ozone that is present in the Earth's lower atmosphere. It is created by chemical reactions between VOCs and NOx in the presence of sunlight.
Greenhouse Gases	Gases that trap heat in the atmosphere, contributing to global warming and climate change.
Nitrogen Dioxide (NO₂)	A toxic gas that contributes to the formation of ground-level ozone and fine particulate matter.
Ozone (O₃)	A gas composed of three oxygen atoms. Ground-level ozone is a harmful air pollutant and a primary component of smog.
Particulate Matter (PM)	Tiny particles suspended in the air, including dust, dirt, soot, and smoke.

Air Pollution	The presence of harmful or excessive quantities of substances in the air, which can include gases, particulates, and biological molecules.
Air-Purifying Plants	Plants that can help remove pollutants from the air and improve indoor air quality.
Air Quality Index (AQI)	A system used to communicate how polluted the air currently is or how polluted it is forecast to become.
Asbestos	A group of minerals that are found in the environment and used in building materials. Asbestos fibers can cause serious health problems, including lung cancer and mesothelioma, when inhaled.
Carbon Monoxide (CO)	A colorless, odorless gas produced by the incomplete combustion of fossil fuels. It can interfere with the body's ability to transport oxygen.
Clean Cooking Fuels	Fuels that produce fewer pollutants when burned, such as electricity, LPG, natural gas, and ethanol.
Environmental Justice	A movement that seeks to address the inequities faced by marginalized communities in relation to environmental hazards and health outcomes.
Ground-Level Ozone	Ozone that is present in the Earth's lower atmosphere. It is created by chemical reactions between VOCs and NO _x in the presence of sunlight.
Greenhouse Gases	Gases that trap heat in the atmosphere, contributing to global warming and climate change.
Nitrogen Dioxide (NO₂)	A toxic gas that contributes to the formation of ground-level ozone and fine particulate matter.
Ozone (O₃)	A gas composed of three oxygen atoms. Ground-level ozone is a harmful air pollutant and a primary component of smog.
Particulate Matter (PM)	Tiny particles suspended in the air, including dust, dirt, soot, and smoke.
Public Health	The science and practice of protecting and improving the health of people and their communities through disease prevention, health promotion, and health policy.
Radon	A naturally occurring radioactive gas that can accumulate indoors and increase the risk of lung cancer.

Renewable Energy	Energy from sources that are naturally replenishing and sustainable over the long term, such as solar, wind, and hydroelectric power.
Smog	A type of intense air pollution often seen in urban areas.
Sulfur Dioxide (SO₂)	A gas produced by the burning of fossil fuels and industrial processes.
Sustainable Transportation	Modes of transportation that have a lower environmental impact, including walking, cycling, carpooling, and using public transit.
Volatile Organic Compounds (VOCs)	Organic chemicals that easily evaporate at room temperature.

References

- [1] https://www.who.int/health-topics/air-pollution#tab=tab_2
- [2] https://www.who.int/health-topics/air-pollution#tab=tab_3
- [3] <https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/>
- [4] <https://aqli.epic.uchicago.edu/country-spotlight/india/>
- [5] <https://www.stateofglobalair.org/>
- [6] <https://www.who.int/data/gho/data/themes/air-pollution>
- [7] https://www.greenpeace.org/static/planet4-romania-stateless/2021/03/d8050eab-2020-world_air_quality_report.pdf
- [8] Pandey, A. et al. (2021) 'Health and economic impact of air pollution in the states of India: the Global Burden of Disease Study 2019', The Lancet Planetary Health, 5(1), pp. e25–e38. doi:10.1016/S2542-5196(20)30298-9. Available at: <https://www.thelancet.com/action/showPdf?pii=S2542-5196%2820%2930298-9>
- [9] <https://aqli.epic.uchicago.edu/pollution-facts/>
- [10] Fuller, R. et al. (2022) 'Pollution and health: a progress update', The Lancet Planetary Health. doi:10.1016/S2542-5196(22)00090-0. Available at: <https://www.thelancet.com/action/showPdf?pii=S2542-5196%2822%2900090-05>
- [11] https://www.unep.org/interactives/air-pollution-note/?gad_source=1&gclid=CjwKCAiAqNSsBhAvEiwAn_tmxQrfm3VKt-iPGEdXzgHor4V52VMdCpZYT0WHHGcJs_oM-1FVKxnKDRoCs2QQA_vD_BwE
- [12] State of Global Air Regional Air Quality Snapshot
- [13] <https://aqli.epic.uchicago.edu/news/aqli-top-charts-2023/>
- [14] https://aqli.epic.uchicago.edu/wp-content/uploads/2023/08/India-FactSheet-2023_Final.pdf
- [15] <https://www.iqair.com/world-air-quality-report>
- [16] <https://www.nature.com/articles/s41467-018-06885-9>

DOCTORS FOR CLEAN AIR AND CLIMATE ACTION



Snapshot from launch of DFCA in 2018



Join Now

www.dfca.org.in



An initiative of



**LUNG CARE
FOUNDATION**

www.lcf.org.in