

DECEMBER 2018



# GETTING THE WORD OUT

Health Risk  
Communication  
Strategies for  
Ahmedabad's  
AIR Plan



### **About the Indian Institute of Public Health, Gandhinagar**

The Indian Institute of Public Health Gandhinagar (IIPHG) is India's first Public Health University. IIPHG aims to strengthen the overall health system in the country through education, training, research, and advocacy/policy initiatives. The institute started its operations in July 2008 from with the commencement of its 1<sup>st</sup> batch of Post Graduate Diploma in Public Health Management (PGDPHM). IIPHG is India's largest public health university and is the hub for excellence in public health teaching, public health innovation, research and practice. [iiphg.edu.in](http://iiphg.edu.in)

### **About the Natural Resources Defense Council**

The Natural Resources Defense Council (NRDC) is an international environmental organization with more than 3 million members and online supporters. Since 1970, our scientists, lawyers and other environmental specialists have worked to protect the world's natural resources, public health, and the environment. NRDC works in the United States, China, India, Canada, Latin America, as well as on global initiatives to address climate change, protect nature, and promote healthy people and thriving communities. In India, NRDC works with local partners on transformative solutions to advance clean energy and climate resilience. [www.nrdc.org](http://www.nrdc.org)

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### **About Ahmedabad Air Quality Expert Working Group**

The Ahmedabad air quality expert working group (EWG) is a group of local institutions convened to support the AMC with expert advice and recommendations to improve air quality. The EWG brings together leading academics from a range of disciplines spanning public policy, urban planning, transportation, energy, environmental, law, communications, public health among others. IIPHG is the secretariat for the EWG.

Members of EWG:

- Dr. Amit Garg, Vidhee Avashia - *Indian Institute of Management-Ahmedabad (IIM-A)*
- Dr. Dileep Mavalankar, Dr. Shyam Pingle - *Indian Institute of Public Health-Gandhinagar (IIPH-G)*
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- Dr. Anurag Kandya - *Pandit Deendayal Petroleum University*
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- Praveen Mishra - *Mudra Institute of Communications (MICA)*
- Asha Verma - *Gujarat National Law University*
- Shikha Rokadiya - *International Council on Clean Transportation (ICCT)*
- Dilip Surkar, Megha Saklani - *Vikram A Sarabhai Community Science Centre*
- Mihir Bhatt - *All India Disaster Management Institute (AIDMI)*
- Dr. Rekha Sadhu, Dr. Ankit Viramgami, *National Institute of Occupational Health (NIOH)*

### **Acknowledgments**

The authors of this report recognize the efforts of the Ahmedabad Municipal Corporation leadership and the Health Department as well as the Indian Institute of Tropical Meteorology, Ministry of Earth Sciences' SAFAR Program. The Gujarat State Pollution Control Board has also been instrumental in implementation of the Ahmedabad air pollution efforts.

We thank the following peer reviewers for their valuable comments: Dr. Shyam Pingle and Dr. Hem Dholakia. We sincerely appreciate the valuable contributions by the following individuals: Laasya Bhagavatula, Priya Dutta, Mary Heglar, Kim Knowlton, Prima Madan, Sathish LM. We also thank the Ahmedabad expert working group for the discussions and feedback in developing the health risk communication materials.

Air pollution is a major environmental health challenge in Indian cities, which suffer from some of the highest pollution levels in the world.<sup>1</sup> While national momentum builds toward concerted action to reduce air pollution, cities are taking steps to protect the health of local communities. In 2017, the city of Ahmedabad launched a regional air pollution monitoring and risk communication project, called the Air Information and Response (AIR) Plan.<sup>2</sup>

The centerpiece of the plan is an air quality index (AQI), developed by the Indian Institute of Tropical Meteorology's System for Air Quality and Weather Forecasting and Research (IITM-SAFAR) program. The AQI summarizes information from 10 continuous air pollution monitoring stations in the region. The data from each station can be used to help people avoid exposure to harmful air and, more broadly, to inform policies aimed at achieving cleaner air. The Ahmedabad Municipal Corporation (AMC) developed the AIR Plan in collaboration with the IITM-SAFAR program, the Indian Institute of Public Health Gandhinagar (IIPH-G), and the Natural Resources Defense Council (NRDC).

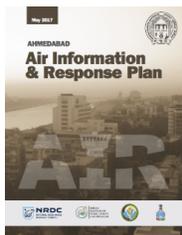
To promote the AIR plan, AMC and its partners developed communication strategies, including the information, education, communication (IEC) materials and school flag program. All of these strategies are based on scientific evidence and research. This issue brief explores that evidence. These materials were discussed, developed and reviewed by the Ahmedabad Expert Working Group focused on air pollution.

## **I. Ahmedabad Air Information and Response Plan (AIR Plan)**

The AIR Plan is Ahmedabad's first effort to comprehensively monitor air quality, and to communicate about pollution to the public to mitigate exposure and protect health. The plan includes a health-based governance framework designed to increase public awareness, reduce risk of exposure, and facilitate longer-term policy action to reduce air pollution. With IITM-SAFAR's AQI at its center, the plan facilitates the sharing of information on air quality, increases population preparedness for acute air pollution episodes, and improves response coordination to reduce the health impacts of air pollution on vulnerable populations.

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### **The Ahmedabad Air Information and Response (AIR) Plan**



In 2017, the city of Ahmedabad launched a regional air pollution monitoring and health risk communication project, the Air Information and Response (AIR) Plan. The centerpiece of the plan is an expanded Air Quality Index (AQI) that summarizes information from ten new, continuous air pollution monitoring stations in the region, each reporting data that can help people avoid harmful exposures and inform policy strategies to achieve cleaner air.

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Based on the comprehensive scientific evidence, the AIR Plan incorporates three main outreach strategies for risk communication: (1) local air pollution warning system; (2) public information, education, and communication strategies; and (3) school flag program.

#### **1. A Local Air Pollution Warning System**

Each day, monitored air quality is categorized into one of five categories that range from good to severe. The daily AQI is available online<sup>3</sup>, through email alerts and mobile phone applications, via a toll-free automated phone system, and on 12 prominent electronic display boards placed around the city (see

Fig.1). To raise awareness about the health risks posed by air pollution, the AMC disseminates alerts and warnings on poor air quality days. A Health Alert or a Health Warning is issued through these AQI systems when the next day's AQI is forecasted city-wide to be very poor or severe, respectively (see Fig. 3).



**Figure 1:** Digital display board of Indian Institute of Tropical Meteorology-System of Air and Weather Forecasting and Research (IITM-SAFAR) forecast city-wide air quality index (AQI), one of 12 in Ahmedabad. Photo: NRDC (2018).

## 2. Public Information, Education, and Communication Materials

A key element of the AIR Plan's communication strategy is the development and dissemination of tailored IEC materials to explain the air quality index and to provide more general information about the health risks of air pollution to Ahmedabad residents. The AMC directly engages with local media to inform the public about the importance of air quality, its impacts on public health, and the role of the AQI in publicizing these risks.

## 3. School Flag Program

Air quality is critically important for the health of children. A school flag program launched by the AMC uses color-coded flags in local schools to announce each day's AQI forecast so that students can take recommended actions to reduce personal exposure, if required. The program is now in over 90 schools and reaches approximately 140,000 students daily. Environmental education is particularly important for vulnerable populations, such as children, the elderly, those with existing illnesses, and people who spend time in highly polluted areas where they live, work, or play.

Ahmedabad is one of the first places in India where city leaders, state government authorities, and civil society groups are working together to address the air pollution challenge with a focus on public health risk communication. The lessons learned from the development of the AIR Plan and its associated information, education, and communications materials serve as a template for other cities aiming to address the heavy burden of air pollution on public health.

## II. Science Matters: Health Risk Communication

A scientific evidence-based approach guides all of the risk communication efforts in Ahmedabad. Given the substantial burden of air pollution on human health in India, proven strategies for protecting health and improving environmental conditions are vital. Evidence from multiple scientific channels, including peer-reviewed literature and direct consultation with national and international experts, has informed the city's outreach activities. All risk communication materials have been developed in collaboration with local communities, medical professionals, and civil society groups.

Prior to AIR Plan development, pulmonologists and other medical professionals from Ahmedabad, New Delhi, and abroad were consulted on the public health risks posed by air pollution, with a focus on vulnerable groups.<sup>4</sup> Other members of the AIR Plan stakeholder coalition included experts from the AMC and city Health Department, AMC MET Medical College, Ashrai Associates and Sparsh Chest Diseases Center, and Apollo Hospital. Local physicians, pediatricians, medical officers, community-based healthcare professionals, ambulance service staff, medical college professors, urban planners and other local environmental professionals were also engaged in the coalition and plan development process. The epidemiologic research and local experiences of medical professionals underlined the fact that children were especially vulnerable to air pollution.<sup>5</sup> As such, city educators and students were consulted to inform interventions that met local needs.<sup>6</sup>

After conducting stakeholder outreach on air pollution in Ahmedabad, an Expert Working Group consisting of regional academic and research institutes was convened to help AMC develop and implement a set of risk communication tools (see Fig.2). This group is comprised of local leaders from government, academia, and the non-profit sector, representing the interdisciplinary expertise that will be key to achieving sustainable actions on air pollution mitigation.<sup>7</sup> The group met in January 2018 to discuss content for risk communication materials, and to provide technical feedback on the next iteration of risk communication advertisements, some of which are featured in this issue brief.

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### Ahmedabad Expert Working Group on Air Quality



**Figure 2:** Meetings of the Ahmedabad Expert Working Group on air quality in May 2018 and February 2018. Photos: NRDC-IIPHG (2018).

The Ahmedabad Expert Working Group on air quality is comprised of local leaders from government, academia and the nonprofit sector. It represents interdisciplinary expertise that is key to achieving sustainable actions on air pollution mitigation. The group includes representatives from the Indian Institute of Management-Ahmedabad, CEPT University, The International Council on Clean Transportation, Pandit Deendayal Petroleum University, Gujarat Energy Research & Management Institute, Indian Institute of Public Health-Gandhinagar, AMC-LG Hospital, All India Disaster Mitigation

Ahmedabad's evidence-based risk communication strategies drawing on published evidence sources are helping to heighten awareness of the city's air pollution challenge and to motivate actions to safeguard public health. To enhance community knowledge, the local government, with support from partners at NRDC and IIPH-G, along the Expert Working Group, developed enhanced information, education, and communication materials. Essential elements for effective risk communication are information quality, transparency, simplicity and timeliness.<sup>8</sup> In Ahmedabad, IITM-SAFAR and the AMC publicize city-wide and site-specific AQI values through multiple channels, including online (e.g., email and text message alerts) and offline modes (e.g., digital display boards). The electronic display boards can help reach the considerable portion of the population for whom the internet may be unavailable, inaccessible or unaffordable.<sup>9</sup> In addition, members of the local media played an important role in developing the AIR Plan. Specifically, journalists provided advice on effective communication and messaging techniques to reach the broader community, including to disproportionately-impacted groups.<sup>10</sup>

### **III. Sounding The Alarm: The City's Warning System**

The AMC is responsible for civic infrastructure and administration, and is also at the center of the AIR Plan coalition. Led by the mayor and a municipal commissioner, the AMC Health Department is accountable for community health strategies. The AMC appointed an officer within the Health Department to conduct the program, including outreach to coalition stakeholders. Additionally, because air pollution sources can affect large geographic areas across different sectors, statewide coordination between agencies is necessary to effectively combat air pollution.<sup>11</sup> Interagency efforts have supported positive working relationships, cooperation, and consultation.

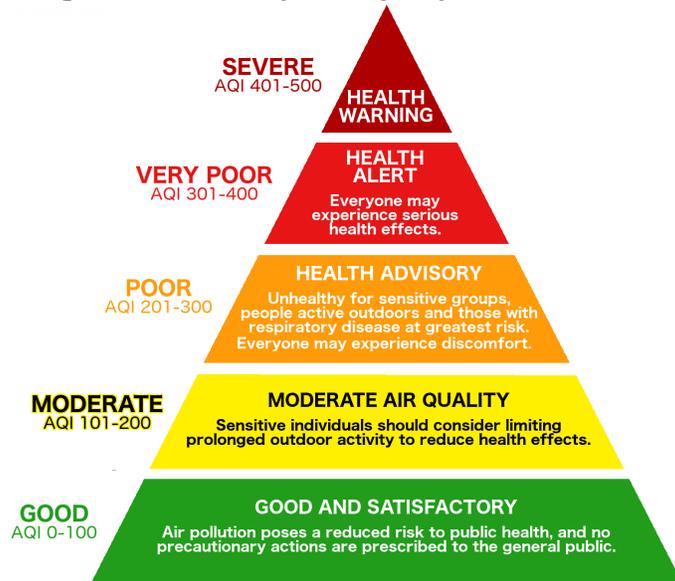
The IITM-SAFAR air pollution monitoring network consists of ten air pollution monitoring stations in and around Ahmedabad. Each station monitors and reports the current AQI in real time (on LED light board displays, posters and billboards, the IITM-SAFAR web portal), and this data informs the forecasted daily AQI for the following two days. The monitors report pollutant-specific AQI levels based on the benchmarks specified in Table 1 below. On days when levels of multiple pollutants are high, the site-level AQI is designated as the highest AQI for any specific pollutant at that site. IITM-SAFAR also calculates a city-wide average AQI based on each of the site-level AQI values. Health Warnings and Alerts are based on the city-wide average AQI.

**Table 1:** IITM-SAFAR air quality descriptors, AQI numeric values, and corresponding air pollution concentrations and temporal averaging periods. Source: SAFAR (2018)<sup>3</sup>

Air Quality Descriptor	AQI Overall Value	PM <sub>2.5</sub> (µg/m <sup>3</sup> ) 24-hr average	PM <sub>10</sub> (µg/m <sup>3</sup> ) 24-hr average	O <sub>3</sub> (ppb) 8-hr average	NO <sub>2</sub> (ppb) 24-hr average	CO (ppm) 8-hr average
Good	0-100	0-60	0-100	0-50	0-43	0-1.7
Moderate	101-200	61-90	101-250	51-84	44-96	1.8-8.7
Poor	201-300	91-120	251-350	85-104	97-149	8.8-14.8
Very Poor	301-400	121-250	351-430	105-374	150-213	14.9-29.7
Severe	401-500	251-350	431-550	375-450	214-750	29.8-40

The figures below (see Figs. 3 and 4) display the IITM-SAFAR air quality descriptors, AQI ranges, and associated health warning messages for the city-wide AQI. These three types of messages are tailored to reflect the severity of forecasted air quality episodes: (1) A Health Alert is issued when the next day’s city-wide AQI is forecast to be Very Poor (red, AQI levels 301–400); (2) A Health Warning is issued when the city-wide AQI is forecast to be Severe (maroon, AQI levels 401–500); (3) When the city-wide forecast is Poor (orange, AQI levels 201–300) or worse, a Health Advisory is sent by mass text message communication to subscribed mobile phone users.

Each AQI category is associated with a health advisory message that provides information on exposure risk and recommended precautions. As air quality deteriorates from the Good level, health advisory messages provide specific information about the increasing risks to public health. For example, an AQI level of 201–300 is associated with a Poor level of air quality, and indicates that sensitive populations, such as children, adults who are active outdoors, and people with respiratory disease, will experience unhealthy conditions outside. An AQI level of 301–400 (Very Poor) or 401–500 (Severe) represents a public health risk that applies to the entire population. Accordingly, health advisory statements recommend reducing prolonged outdoor activity as air quality worsens.



**Figure 3:** IITM-SAFAR AQI air quality descriptors, index value ranges, and associated health warning messages. AQI levels 301–400 activate a Health Alert in Ahmedabad, while levels 401–500 activate a city-wide Health Warning. Source: SAFAR (2018).<sup>3</sup>

<b>Air Quality Index (AQI)</b>	<b>PM 2.5 Health Advisory</b>	<b>PM 2.5 Health Effect Statement</b>	<b>Overall Associated Health Impact with AQI Level</b>
Good (0 – 100)	No cautionary action required	Air pollution poses little or no risk	Minimal impact
Moderate (101 – 200)	Unusually sensitive people should consider reducing prolonged or heavy exertion and heavy outdoor work	Air quality acceptable for general public but moderate health concern for sensitive people	May cause breathing discomfort to the people with lung disease such as asthma and discomfort to people with heart disease, children and older adults
Poor (201 – 300)	Children and adult with heart or lung disease, should reduce prolonged or heavy exertion and limit outdoor activity	Children and adult people at risk. More chances of precipitating respiratory symptoms in sensitive individuals.	May precipitate severe attack on short term exposure in high risk individuals and respiratory symptoms (breathing discomfort) in normal individual on long term exposure.
Very Poor (301 – 400) Triggers <b>“Health Alert”</b>	Everyone should reduce prolonged or heavy exertion. More caution for children or adult with heart or lung disease.	Triggers health alert. Everyone may experience more health effects. Significant increase in respiratory effects in general population	May cause mild respiratory problems in normal individual/ more pronounced in people with lung and heart disease.
Severe (401 – 500) Triggers <b>“Health Warning”</b>	Everyone should avoid all outdoor physical activity. Sensitive individual should remain indoor with minimal activity.	Should be declared as emergency condition. Serious risk of respiratory effect in general population as high risk.	May cause respiratory effects even on healthy people and serious health impacts on people with lung and heart diseases. The health impacts may be experienced even during light physical activity

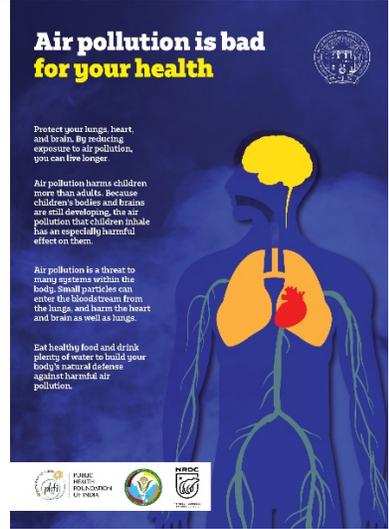
AQI index value ranges are shown on the left; associated public health impacts in the middle; and air quality descriptors on the right.

**Figure 4:** IITM-SAFAR AQI health advisory statements for forecast local fine particle (PM<sub>2.5</sub>) levels. Source: SAFAR (2018).<sup>3</sup>

#### IV. Going Public: Health Risk Advertisements

A key aim of the AIR Plan is to enhance public awareness about the health risks posed by air pollution through outreach communication throughout the year. Specifically, the plan supports communication of the AQI and health protection strategies to local communities through a range of tools. These include 12 new LED light board displays, posters and billboards, the IITM-SAFAR web portal, mobile phone text messages, news media coverage, and printed information, education, and communication materials.

Based on consultation with local experts, journalists, and international leaders, as well as documented best practices for risk communication, the AIR Plan team developed three key advertisements (see Fig.5). Each one covers a specific topic, and the advertisements are used simultaneously throughout the year: (1) the health risks posed by air pollution, (2) precautions one can take to avoid the worst health effects of air pollution, and (3) evidence-based recommendations to improve local air quality. The statements presented in these advertisements are supported by the peer-reviewed findings of public health experts.

	<h3>Health Risks Posed by Air Pollution</h3> <p>In 2014, Ahmedabad was among the five most polluted cities in India for small particle (PM<sub>2.5</sub>) pollution and ranked in the top fifteen globally.<sup>12</sup> The health risks of the city's severe air pollution are acute, especially for vulnerable groups like children and those with pre-existing medical conditions. This advertisement cautions residents about the significant risks posed by air pollution:</p> <ul style="list-style-type: none"><li>• Urging people to protect major organs that are affected by air pollution (the lungs, heart, and brain).<sup>13</sup> Air pollution is a threat to many systems within the body because small particles can enter the bloodstream from the lungs, and then harm the heart and brain.<sup>14</sup></li><li>• Making the connection between reduced exposure to air pollution and a longer life.<sup>15</sup></li><li>• Highlighting the fact that air pollution harms children more than adults. Because children's bodies and brains are still developing, the air pollution that children inhale has an especially harmful effect on them.<sup>16</sup></li><li>• Promoting a healthy diet and hydration to build the body's natural defense against harmful air pollution.<sup>17</sup></li></ul>
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<p><b>Take precautions to protect yourself from air pollution</b></p> <p>Check SAFAR website (<a href="http://www.aqi.gov.in">www.aqi.gov.in</a>) and download the SAFAR Air Quality Index (AQI) mobile app to keep a daily check on air pollution levels.</p> <p>Limit outdoor activity during high air pollution episodes.</p> <p>Before any strenuous physical activity or work outdoors, check the current AQI level.</p> <p>If you have respiratory ailments, like bronchitis or asthma, keep your medications handy.</p> <p>If you're having trouble breathing, see a health professional. Take advice from health professionals about opting for protective gear.</p> <p>Logos: Public Health Foundation of India, NRDC, IITM</p>	<p><b>Precautions Individuals Can Take to Avoid the Worst Health Effects of Air Pollution</b></p> <p>The SAFAR-based AQI allows the citizens of Ahmedabad to better understand local air quality and associated risks to public health. This advertisement focuses on effective strategies for minimizing the health risks from polluted air:</p> <ul style="list-style-type: none"> <li>• Checking the IITM-SAFAR website and download the IITM-SAFAR Air Quality Index (AQI) mobile app to keep a daily check on air pollution levels.<sup>18</sup></li> <li>• Limiting outdoor activity during high air pollution episodes.<sup>19</sup></li> <li>• Before undertaking any strenuous physical activity or work outdoors, to check the current AQI level.<sup>20</sup></li> <li>• Reminding anyone with respiratory ailments, like bronchitis or asthma, to keep medications handy.<sup>21</sup></li> <li>• If a person is having trouble breathing, a health professional should be sought out. Patients should take advice from health professionals about opting for protective gear.<sup>22</sup></li> </ul>
<p><b>Steps you can take to help improve air quality</b></p> <p>Instead of using a car, consider taking public modes like buses and trains.</p> <p>Cycling benefits your health and helps reduce pollution.</p> <p>Avoid highly trafficked roads during rush hour. More congestion means more pollution.</p> <p>Don't burn trash, outdoors or indoors, because harmful air pollutants are released by burning.</p> <p>Logos: Public Health Foundation of India, NRDC, IITM</p>	<p><b>Steps to Improve Local Air Quality</b></p> <p>Ahmedabad's inland location, as well as its dry and hot climate, can worsen air pollution in the city. This advertisement was designed to draw attention to individual choices that can help to improve local air quality, including:</p> <ul style="list-style-type: none"> <li>• Encouraging people to consider taking public modes of transportation like buses and trains instead of driving a car.<sup>23</sup></li> <li>• Riding a bicycle, which benefits health and helps reduce pollution.<sup>24</sup></li> <li>• Avoiding highly trafficked roads during rush hour, because more congestion means more pollution.<sup>25</sup></li> <li>• Never burning trash, outdoors or indoors, because harmful air pollutants are released by burning.<sup>26</sup></li> </ul>

**Figure 5:** Three key advertisements developed by the AIR Plan team, each covering a specific topic (1) the health risks posed by air pollution, (2) precautions one can take to avoid the worst health effects of air pollution, and (3) evidence-based recommendations to improve local air quality. Source: NRDC-IIPHG, 2018

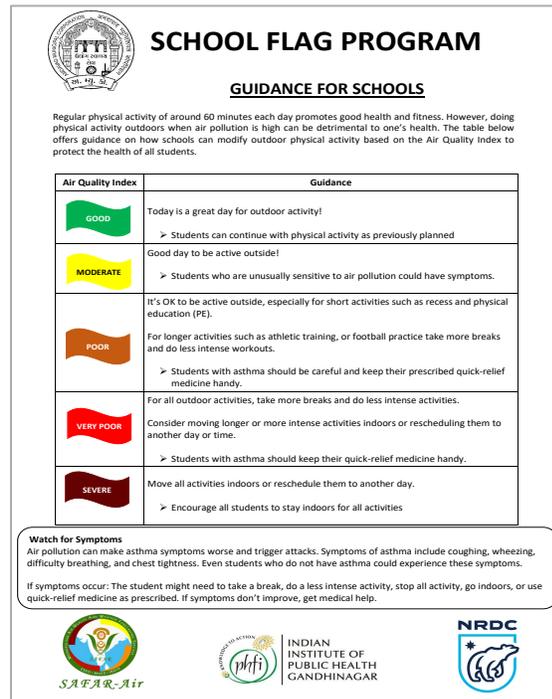
## VI. Waving High: School Flag Program

Based on the experiences of local medical professionals and the epidemiologic evidence, it is clear that children are especially vulnerable to air pollution. Since children have growing bodies—lungs, brains, nervous systems—they are at particular risk from this harmful exposure. Children also spend more time outdoors and breathe about in 50% more air (and pollution) per pound of body weight than adults.<sup>27</sup> Public health studies have shown irreparable harm to lung function and brain development in children due to air pollution. Youth with asthma are at even greater risk of other adverse health impacts from pollution exposure. As such, city educators and students were consulted to inform interventions to meet local needs.



**Figure 6.** From the left: Students at Zebar School point to an orange flag hoisted on school campus denoting a local IITM-SAFAR forecast for Poor air quality on 31 January, 2018; AMC Health Department (Dr. Chirag Shah), IITM-SAFAR (Dr. Gufran Beig) IIPH-G (Dr. Dileep Mavalankar, Dr. Priya Dutta), and NRDC (Anjali Jaiswal, Sayantan Sarkar) staff presenting AIR Plan outreach materials for the school flag program in October 2017. Photos: NRDC (2018)

In May 2017, Minister Dr. Harsh Vardhan launched the Ahmedabad School Flag program, a targeted, school-based risk communication and education effort.<sup>28</sup> Under this initiative, the AMC provided colored flags corresponding to the five AQI categories to over 90 participating schools across the city reaching approximately 140,000 students. A single flag is displayed at schools on weekday mornings corresponding to the city-wide IITM-SAFAR AQI forecast for that day. The School Flag program also deploys informative posters that educate students on the AQI pollution categories and provide advice on how to modify outdoor activities when the air quality is unhealthy (see Fig.7). School officials can also restrict or limit outdoor, physical activity for children during school hours when air pollution may be at its worst.



**Figure 7:** Informative posters developed to support the School Flag Program that explain what different AQI colors mean and associated recommendations. Source: NRDC-IIPHG (2018).

The School Flag program helps to protect children by informing them about air pollution levels, related health impacts, and preventative steps (see Fig.8). Modeled on similar initiatives in China and the United States, the program enhances environmental literacy for students by highlighting the links between air quality and health and identifying the steps that can be taken to reduce one's exposure to pollution. It also speaks to the larger promise of environmental education in India to improve societal awareness to problems that threaten the well-being of vulnerable populations—including children, the elderly, those with existing illness, and people who spend time in highly polluted areas where they live, work, or play.

While launching the program, Ahmedabad Mayor Gautam Shah said, “The children and the elderly are at maximum risk when air pollution increases. To protect them from the ill-effects of pollution, we decided to introduce the school flag program.” Since the program launch, follow-up roundtable discussions were held with representatives from 14 schools, including principals, teachers, and event coordinators. In these discussions, school staff noted that the program was helping to engage students and also signaled an opportunity for further education and outreach on air pollution, including projects to enhance the school flag program. Recommended future projects include multimedia outreach (videos, pamphlets and social media), communications to parents about the program, and risk communication materials translated into Gujarati and Hindi.



**Figure 8:** NRDC Science Fellow Dr. Vijay Limaye meets with fifth grade students at Zebar School for Children for a question-and-answer session about air quality and the school flag program. Photo: NRDC (2018)

## VII. Broader Communication: The Role of Media

The media is vital in spreading the word about air pollution and the AQI. The media plays an essential awareness-building role by sharing news about high air quality levels and increases public protection by drawing attention to the health harms of exposure to polluted air (see Fig.9).

The media in Ahmedabad is a critical stakeholder for generating awareness and raising the public’s consciousness on the need to control air pollution. A multi-pronged communications strategy through print, television, radio, and social media channels can be extremely effective. Our discussions with key stakeholders indicated a high reliance on daily AQI alerts provided in the local print media.



**Figure 9:** Ahmedabad air quantity index data published in the Times of India (Ahmedabad edition) on 12 October 2018.

## Science + Communication = Success

Science-based risk communication strategies support groundbreaking public outreach efforts in Ahmedabad. By employing empirically-tested messages and communication strategies, the AIR Plan helps to protect public health. Locally, the AMC has led the effort to make air pollution, and environmental health and resilience more generally, a municipal priority, and this proactive leadership has been a critical factor in the effectiveness of this work. City leaders have developed productive relationships with their counterparts in state and national government, which have enabled them to work collaboratively on technical and policy solutions.

While the AIR Plan's first phase focused on dissemination of critical air quality information to the public, a longer-term effort is required to familiarize the general population with the wide range of health effects associated with exposure to even relatively moderate levels of air pollution. Effectively equipping the population of Ahmedabad with AQI information is the first step toward research and policy measures to better understand, and eventually mitigate, the harmful effects of polluted air.

## Highlighted Resources

- **Ahmedabad AIR Plan**
  - [www.nrdc.org/sites/default/files/ahmedabad\\_air\\_plan\\_feb\\_2017\\_final\\_pdf.pdf](http://www.nrdc.org/sites/default/files/ahmedabad_air_plan_feb_2017_final_pdf.pdf)
- **AIR Plan Issue Brief**
  - [www.nrdc.org/sites/default/files/ahmedabad\\_aqi\\_-\\_final.pdf](http://www.nrdc.org/sites/default/files/ahmedabad_aqi_-_final.pdf)
- **Air Pollution factsheet**
  - [www.nrdc.org/sites/default/files/air\\_pollution\\_factsheet\\_final\\_0.pdf](http://www.nrdc.org/sites/default/files/air_pollution_factsheet_final_0.pdf)
- **Blogs**
  - [www.nrdc.org/experts/anjali-jaiswal/health-first-ahmedabads-groundbreaking-air-plan](http://www.nrdc.org/experts/anjali-jaiswal/health-first-ahmedabads-groundbreaking-air-plan)
  - [www.nrdc.org/experts/anjali-jaiswal/children-first-frontlines-indias-air-pollution-crisis](http://www.nrdc.org/experts/anjali-jaiswal/children-first-frontlines-indias-air-pollution-crisis)
  - [www.nrdc.org/experts/anjali-jaiswal/air-pollution-indian-cties-start-fight-back](http://www.nrdc.org/experts/anjali-jaiswal/air-pollution-indian-cties-start-fight-back)
  - [www.nrdc.org/experts/frances-beinecke/ahmedabad-india-protecting-most-vulnerable-dangerous-air-pollution](http://www.nrdc.org/experts/frances-beinecke/ahmedabad-india-protecting-most-vulnerable-dangerous-air-pollution)
  - [www.nrdc.org/experts/nehmat-kaur/flagging-air-pollution-school-children-ahmedabad](http://www.nrdc.org/experts/nehmat-kaur/flagging-air-pollution-school-children-ahmedabad)
  - [www.nrdc.org/experts/vijay-limaye/new-monitoring-air-quality-ahmedabad-protects-health](http://www.nrdc.org/experts/vijay-limaye/new-monitoring-air-quality-ahmedabad-protects-health)
  - [www.nrdc.org/experts/vijay-limaye/ahmedabads-air-plan-classrooms-community](http://www.nrdc.org/experts/vijay-limaye/ahmedabads-air-plan-classrooms-community)
  - [www.nrdc.org/experts/anjali-jaiswal/back-basics-clean-air-india](http://www.nrdc.org/experts/anjali-jaiswal/back-basics-clean-air-india)
  - <https://www.nrdc.org/experts/anjali-jaiswal/return-delhi-smog>
- **Peer-Reviewed Publications**
  - Vijay Limaye et al., “Development of Ahmedabad’s Air Information and Response (AIR) Plan to Protect Public Health,” *International Journal of Environmental Research and Public Health* 28 (2018): 1-28.
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## Air pollution is bad for your health



Protect your lungs, heart, and brain. By reducing exposure to air pollution, you can live longer.

Air pollution harms children more than adults. Because children's bodies and brains are still developing, the air pollution that children inhale has an especially harmful effect on them.

Air pollution is a threat to many systems within the body. Small particles can enter the bloodstream from the lungs, and harm the heart and brain as well as lungs.

Eat healthy food and drink plenty of water to build your body's natural defense against harmful air pollution.



## Steps you can take to help improve air quality



- Instead of using a car, consider taking public modes like buses and trains.
- Cycling benefits your health and helps reduce pollution.
- Avoid highly trafficked roads during rush hour. More congestion means more pollution.
- Don't burn trash, outdoors or indoors, because harmful air pollutants are released by burning.




## Take precautions to protect yourself from air pollution



- Check SAFAR website ([www.http://safar.tropmet.res.in](http://safar.tropmet.res.in)) and download the SAFAR Air Quality Index (AQI) mobile app to keep a daily check on air pollution levels.
- Limit outdoor activity during high air pollution episodes.
- Before any strenuous physical activity or work outdoors, check the current AQI level.
- If you have respiratory ailments, like bronchitis or asthma, keep your medications handy.
- If you're having trouble breathing, see a health professional. Take advice from health professionals about opting for protective gear.



## Resources and Issue Briefs

December 2018

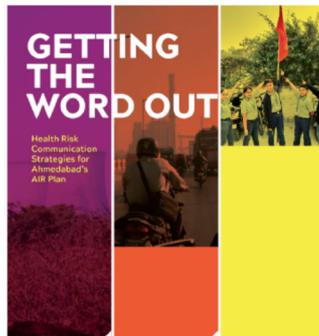
### AHMEDABAD Air Information & Response Plan




DECEMBER 2018

### GETTING THE WORD OUT

Health Risk Communication Strategies for Ahmedabad's AIR Plan




Issue Brief | May 2017

### PROTECTING HEALTH FROM INCREASING AIR POLLUTION IN AHMEDABAD

Supporting Research and Analysis for the Ahmedabad Air Information & Response (AIR) Plan




International Journal of Environmental Research and Public Health

### Development of Ahmedabad's Air Information and Response (AIR) Plan to Protect Public Health

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**Abstract:** India often struggles with rates of the highest ambient air pollution levels in the world. While national efforts are building momentum towards concerted action to reduce air pollution, local-level cities are taking action on the challenge to protect communities from the many health problems caused by this harmful environmental exposure. In 2015, the city of Ahmedabad launched a national air pollution monitoring and risk communication project, the Air Information and Response (AIR) Plan. The overview of the plan is an air quality index developed by the Indian Institute of Tropical Meteorology's System for Air Quality (ISQA) and Weather Forecasting and Response program that combines information from 10 new continuous air pollution monitoring stations in the region, each reporting data that can help predict annual harmful exposure and inform public programs to address danger. This paper focuses on the motivation, development, and implementation of Ahmedabad's AIR Plan. The paper discusses the process of the collaboration with public health agencies to address the most severe of air pollution particularly to vulnerable groups, technical aspects in deploying air monitoring technology, and lessons for the communication and risk communication project. It includes specific health messages and suggested actions to reduce harmful exposures. The city of Ahmedabad is among the first cities in India where local-level government and civil society are working together to address the country's air pollution challenge with a focus on public health. The lessons learned from the development of the AIR Plan serve as a template for other cities to address the heavy burden of air pollution on public health. Effective working relationships are vital since they form the foundation for long-term success and useful knowledge sharing by a range of groups.

**Keywords:** air pollution; exposure mitigation; climate change; India; vulnerability; urban public health; risk communication; community engagement; environmental indicators; environmental monitoring.



INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

### Clearing the Air: Highlighting Actions on Fighting Air Pollution in India

**Abstract:** Air pollution is one of the highest ranking environmental health challenges in the world, especially in developing countries such as India. Since 2010, high air pollution levels and "air emergencies" have been in the news across India. Air pollution is no longer just a Delhi-centric problem, but a major threat to regions across India. To reduce air pollution levels and deadly health risks, leading agencies are taking action to address the threat of air pollution. This fact-sheet highlights actions that key agencies in India are taking to improve air quality and protect communities. The actions highlighted include India's Central Response Action Plan, the Ahmedabad region's health-based clean air program and air quality index. Chennai's health-based air quality monitoring, and Nagpur and Bengaluru's mitigation efforts including electric vehicles. While these actions do not provide a comprehensive list of actions underway to tackle air pollution in India, it highlights several examples that showcase the range of activities and interventions by decision-makers and leading groups across the country. These actions are good first steps toward building more comprehensive action to clear the air.

**THE AIR POLLUTION PROBLEM**  
Air pollution is a serious problem in India. Estimates of quality is measured in PM<sub>2.5</sub> cities, and all of these exceed the World Health Organization's (WHO) safe level of coarse particles (PM<sub>10</sub>)—a major component of urban air pollution. India's cities have one of the highest exposure to PM<sub>2.5</sub> in the world. Particulate Matter (PM) describes a complex mixture of solids and liquids. Particles of 10 micrometers or diameter or smaller (PM<sub>10</sub>) and especially the even finer sized PM<sub>2.5</sub> are so small (much smaller than the width of a human hair, for example) that they can penetrate deep into the lungs, where they can cause serious health problems. Major sources of urban PM<sub>2.5</sub> include road dust, and construction, while smaller PM<sub>2.5</sub> stems from combustion, including vehicles, power plants, industry, waste burning, agricultural burning and cooking with solid fuels. Roadways are right out of every ten Indian cities breathe pollution that contains PM<sub>2.5</sub> at higher levels than recommended in the national safety limits, according to a recent report.



