Air quality

Managing business travel risk

Breathing easier on business trips

Introduction
Air pollution and its impact on business travel

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Tips & tricks
Advice for travel managers and business travelers

Of the 100 global cities most visited by business travelers serviced by BCD Travel, only half have clean air. Look at the Top 10 destinations, and only cities in North America and Southwest Pacific offer air quality that's reliably safe.

How can corporate travel managers protect their travelers when business takes them to places where the state of air quality is alarming? How can business travelers guard against the harmful effects of polluted air? BCD Travel's new Inform report, which looks at air quality and business travel, can help. It's filled with information travel managers can use to protect their travelers and comply with companies' duty of care obligations.

BCD travel

[1] Based on BCD Travel's global flight booking data for 2018

Introduction

Air pollution: a travel manager's concern

We have no choice but to breathe the air around us. But in a lot of places around the world, doing so increasingly exposes us to serious health risks.

Even for perfectly healthy people, short-term exposure to high levels of air pollution can cause immediate symptoms like irritation of the eyes, nose and throat, coughing, chest tightness and shortness of breath.

Long-term exposure can contribute to significant health problems, such as decreased lung function, aggravated asthma, chronic bronchitis or even heart attacks.

According to recent numbers released by the World Health Organization (WHO), 4.2 million people die every year as a consequence of breathing outdoor polluted air.[2]

How does air pollution affect our health?

Microscopic pollutants in the air can slip past your body's defenses, penetrating deep into the respiratory and circulatory systems, damaging lungs, heart and brain. This WHO video explains it in detail.

With only 10% of the world's population breathing clean air, it's safe to say that most workers are regularly exposed to pollution.

Consequences for the economy are high. For instance, the health issues related to air pollution cost the European Union €62 billion (US$70 billion) per year.[3] On a smaller scale, every business feels the impact of air pollution. When it is high, employees get sick and miss work. Or they come to work anyway, and are less productive.[4]

[2] **Breathelife 2030**
[3] **World Health Organization**, *How air pollution is destroying our health*
[4] **European Public Health Alliance**, *Health impacts and health costs of diesel emissions in the EU*

Duty of care and air pollution: an undeniable link

For many professionals, business trips are a fundamental part of the job. But frequent travel can have a big—and negative—impact on travelers' health. According to a recent Traveler wellness study conducted by BCD Travel:

- physical and mental health influence traveler wellness the most
- traveler wellness is particularly important when it comes to talent attraction and retention
- traveler wellness and satisfaction is a Top-3 priority for travel managers, yet few companies have sufficient wellness initiatives in place

Traveler wellness is closely linked to duty of care - a company's moral and legal obligation to take responsibility for the safety of it's travelers. While laws or regulations can differ per country and don't define which specific steps an employer must take to fulfill duty of care, evaluating and mitigating traveler risks should be at the core of every corporate travel program.

Air pollution is pervasive in major cities worldwide. Business travelers visit these cities every day. Therefore, protecting them against the effects of air pollution should be a part of every company's travel risk management program. That's especially important for vulnerable travelers, like those with asthma, but it's important for any employee a company sends on the road. Informing travelers about the risks of air pollution and providing guidance on how they can protect themselves are crucial for keeping them safe.

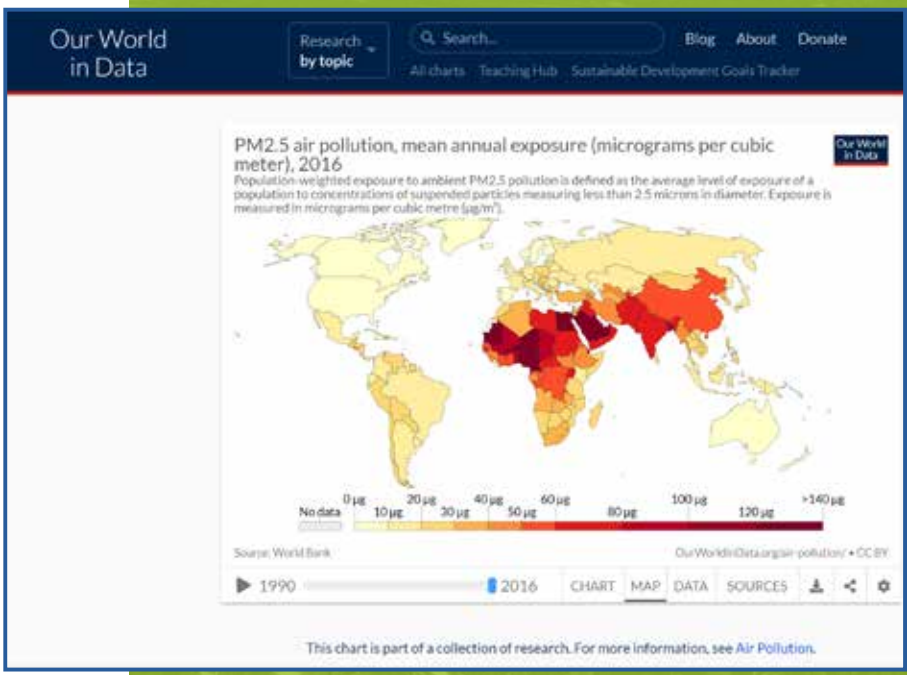
Isn't there any good news?

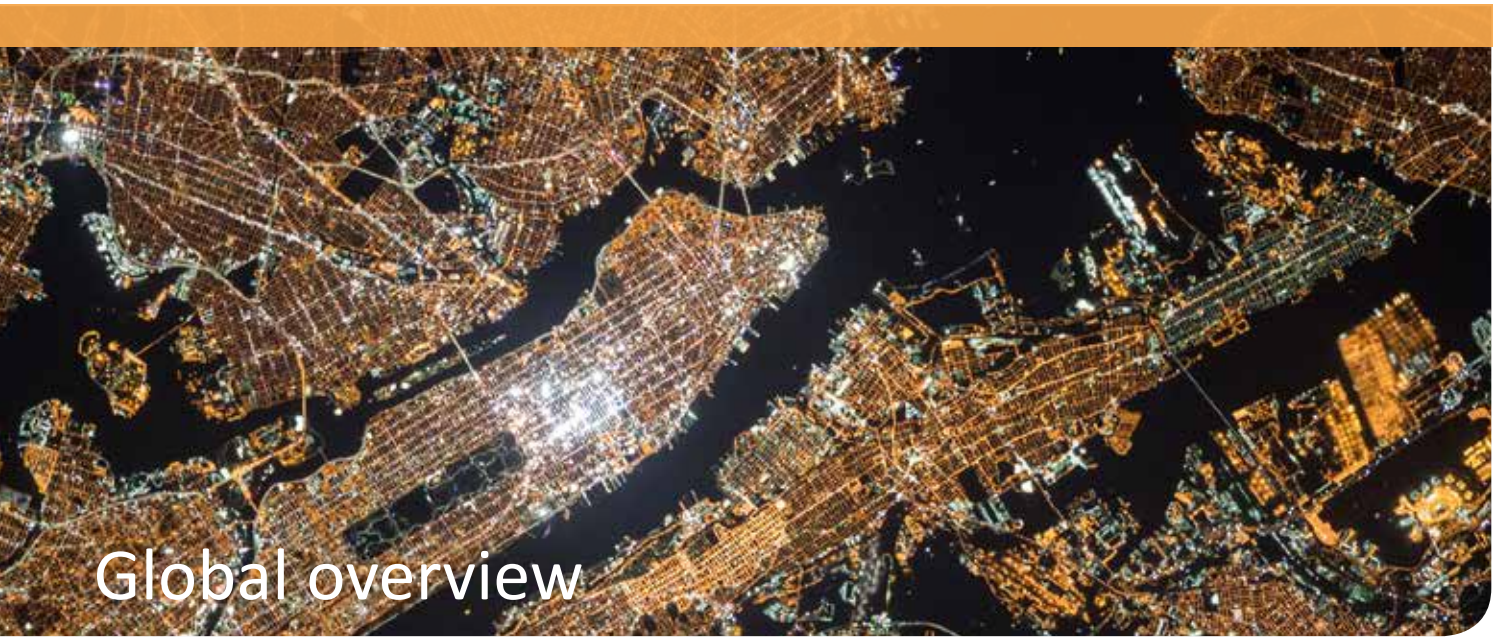
While the latest WHO data show ambient air pollution levels are dangerously high in most parts of the world, they also demonstrate progress.

Countries are taking measures to reduce air pollution from particulate matter. More cities are recording air pollution levels, reflecting a growing commitment to assessing, monitoring and addressing the problem.

Most progress is happening in high-income countries, but interest in improving air quality is growing worldwide.

This interactive map shows the evolution in air pollution from 1990 until 2015.





Global overview

Air quality at the 100 most traveled to destinations worldwide

According to Maria Neira, Director of the Department of Public Health, Social and Environmental Determinants of Health at WHO, "Many of the world's megacities exceed WHO's guideline levels for air quality by more than five times."

In its effort to help businesses and their travelers travel smart around the world, BCD Travel explored air quality at the Top 100 business destinations frequented by the travelers it serves. Travel managers can use this analysis to inform their travel risk management strategies, and travelers can use it to prepare for trips.

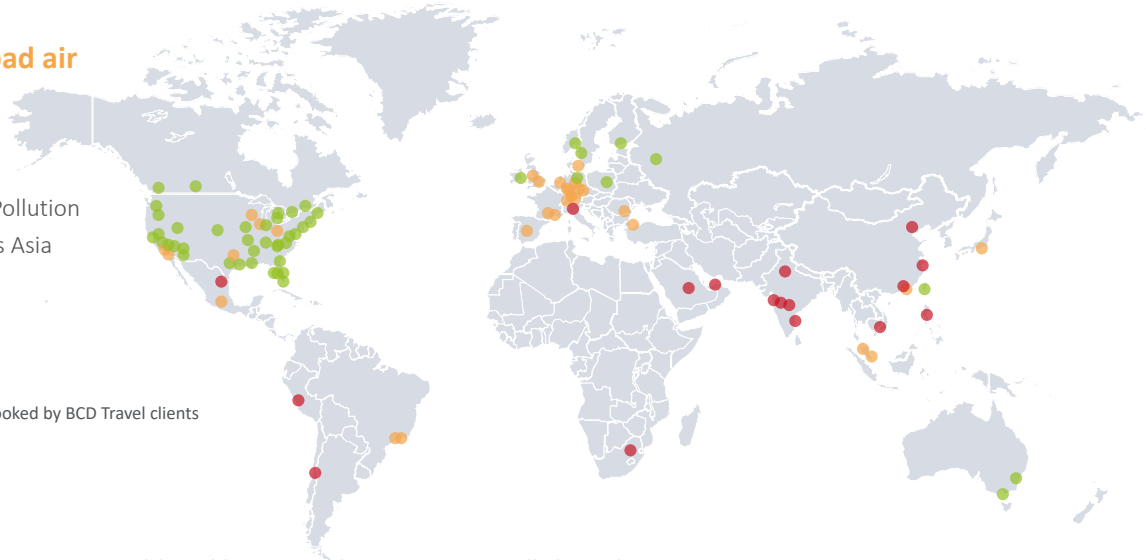
Definitions

WHO measures a wide range of concentrations of fine particulate matter pollutants in the air, but BCD Travel only considered PM2.5 in its analysis because it includes pollutants such as sulphates, nitrates and black carbon, which present the greatest risk to human health.

PM2.5 particulates have a diameter of less than 2.5 micrometers, which is about 3% of the diameter of a human hair; small enough to invade even the tiniest airways. PM2.5 levels up to 10 are considered safe; the levels above 25 are considered hazardous.

Business travel's bad air

Many popular business travel destinations are air pollution hotspots. Pollution levels are highest across Asia and in the Middle East.



Destinations based on flights booked by BCD Travel clients
January 1 - December 31, 2018

Mostly clean air

PM2.5 *<10 µg/m3*

City	µg/m³
Bentonville*	9
Boston	7
Calgary	8
Charlotte	9
Denver	8
Detroit	8
Dublin	9
Fort Lauderdale	6
Gothenburg	7
Helsinki	7
Jacksonville	7
Kansas City	8
Las Vegas	9
Louisville	8
Melbourne	8
Memphis	9
Miami	8
Minneapolis/St Paul	8
Montreal	8
New Orleans	8
New York	7
Oakland	8
Orlando	6
Oslo	9
Philadelphia	9
Phoenix	9
Pittsburgh	9
Portland	7
Providence	8
Raleigh/Durham	9
Richmond	8
Sacramento	8
Salt Lake City	9
San Antonio	9
San Diego	9
San Francisco	8
San Jose, CA	9
Seattle/Tacoma	6
St. Louis	9
Sydney	8
Tampa/St Petersburg	7
Toronto	9
Tucson	6
Vancouver	7
Washington DC	7

Health problems possible

PM2.5 *10 to <26 µg/m3*

City	µg/m³
Berlin	16
Brussels	16
Bucharest	21
Chicago	12
Copenhagen	12
Dallas/Fort Worth	10
Duesseldorf	12
Frankfurt	18
Geneva	13
Hamburg	14
Hong Kong	23
Houston	12
Indianapolis	10
Istanbul	15
Kuala Lumpur	25
London	12
Los Angeles	12
Madrid	10
Manchester	10
Mexico City	22
Milwaukee	10
Moscow	14
Munich	12
Nice	13
Nuremberg	13
Paris	16
Prague	17
Rio de Janeiro	11
Santa Ana	11
Sao Paulo	17
Singapore	18
Stuttgart	15
Taipei	22
Tokyo	17
Toulouse	11
Vienna	14
Warsaw	22
Zurich	10

Potentially hazardous

PM2.5 *>26 µg/m3*

City	µg/m³
Beijing	73
Chennai	49
Delhi	143
Dubai**	61
Ho Chi Minh City	42
Hyderabad	44
Johannesburg	41
Lima	39
Manila	29
Milan	27
Monterrey	36
Mumbai	64
Pune	50
Riyadh	73
Santiago	29
Shanghai	45
Shenzhen	27

*Based on Fayetteville-Springdale-Rogers

**Based on WHO data for Abu Dhabi, which has similar air quality per air-quality.com

In-depth overview

Air quality in the Top 10 business travel destinations per region

Based on our analysis of the 100 most traveled to destinations worldwide, only North America and Southwest Pacific have what scientists would consider “clean” air. Let’s dive into what’s happening in the other regions, explore the Top 10 destinations in each and zoom in on a few key cities.

Europe

Europe is well represented, with London (ranked 2), Berlin (4), Munich (5) and Stuttgart (10) all in the global Top 10. And while Europe’s air quality is nowhere near as bad as in other regions, it isn’t completely safe. According to a 2018 report by the European Environment Agency, 68% of air monitoring stations in the region exceeded WHO guidelines for PM2.5.

Air quality in Europe’s top 10 destinations

Top 10 destinations	PM 2.5 in µg/m³
London	12
Berlin	16
Munich	12
Stuttgart	15
Zurich	10
Vienna	14
Frankfurt	18
Hamburg	14
Madrid	10
Paris	16

Zooming in on Berlin

4th most traveled to destination worldwide*

2nd most popular destination within Europe*

Air pollution levels are **70% higher** than what scientists consider safe (17µg/m³ PM2.5)

* based on BCD Travel’s global flight booking data from 2018

Berlin is notorious within Germany for its poor air quality, especially during **peak traffic hours**. The local government wants to introduce speed limits on major roads to tackle the problem. Environmental groups are calling for a diesel ban in the city and across Germany. Berlin already has a “blue badge” program that only admits cars that meet national emissions standards.

Africa

The United Nations Environment Program calls air pollution Africa's "invisible killer." Increasing urbanization coupled with poor planning mean many people live in congested and poorly constructed housing. This exacerbates the problem of pollution. With limited access to the right analytical technology, it's difficult for the region to fully understand its air quality and the causes and health consequences of pollution.

Zooming in on Johannesburg

62nd most traveled to destination worldwide *

Most popular business travel destination within Africa*

Air pollution levels are **310% higher** than what scientists consider safe (41µg/m³ PM2.5)

* based on BCD Travel's global flight booking data from 2018

Most of Johannesburg's air pollution[5] comes from burning fuel for household cooking and heating, vehicle emissions, industry, biomass burning and mine storage emissions.

Pollution is highest in the **winter months**, when people use fossil fuel to warm their homes.

Air quality in Africa's top 10 destinations

Top 10 destinations	PM 2.5 in µg/m³
Johannesburg	41
Nairobi	17
Tunis	38
Lagos	n/a
Cairo	117
Casablanca	27
Port Elizabeth	n/a
Durban	n/a
Mauritius	6
Dakar	21

Middle East

Air pollution is a widely recognized problem in the Middle East.[6] Levels in Saudi Arabia are among the highest on the planet, aaccording to 2016 data from WHO. Qatar, Kuwait, the United Arab Emirates and Bahrain also have extreme levels of PM2.5. Much of the region's air pollution stems from sand and dust storms originating in the desert, yet population growth, urbanization, industrialization and rampant infrastructure development also play a part.

Zooming in on Dubai

68th most traveled to destination worldwide*

Most popular destination within the Middle East*

Air pollution is **510% higher** than what scientists consider safe (61µg/m³ PM2.5)

* based on BCD Travel's global flight booking data from 2018

Dubai recently announced plans to invest heavily in equipment for monitoring and analyzing air quality

Middle Eastern governments are increasingly making plans to create and sustain cleaner air by tackling the chief causes of manmade pollutants, namely unclean energy sources and construction methods. Clean-tech investments are increasing, but they'll mainly deliver longer-term solutions.

Air quality in the Middle East's top 10 destinations

Top 10 destinations	PM 2.5 in µg/m³
Dubai	61
Riyadh	73
Tel Aviv	24
Kuwait	12
Jeddah	68
Muscat	35
Doha	33
Beirut	32
Dammam	56
Tehran	28

[5] **Huffington Post**, *Johannesburg can't compromise - on air pollution*
[6] World Future Energy Summit.

North America

Among the Top 100 business destinations BCD Travel analyzed, North American cities ranked cleanest overall. However, there was an exception in 2018: wildfire smoke. For a brief period in August, the most-polluted major cities on the planet were Vancouver, British Columbia; Portland, Oregon; and Seattle, Washington. Wildfires burning for weeks had transformed a region known for clean air into a dangerous place to breathe. Scientists predict wildfires will become more common in this area in coming years.

Zooming in on Los Angeles

8th most traveled to destination worldwide*

4th most popular destination within North America*

Air pollution levels are **20% higher** than what scientists consider safe (12µg/m³ PM2.5)

* based on BCD Travel's global flight booking data from 2018

Air monitoring data fom 1970 showed much of the U.S had poor air quality, especially in heavily populated, industrialized cities. In some places, people were losing six years of life expectancy to fine-particle pollution—similar to modern-day Beijing.

The Clean Air Act of 1970 and the federal Environmental Protection Agency, led to tighter controls on pollutants. By 2016, nearly every location in the U.S. outside Southern California met air quality standards.

In locations where air pollution exceeds safe levels, car and industrial emissions and weather are largely to blame.

Air quality in North America's top 10 destinations

Top 10 destinations	PM 2.5 in µg/m³
Chicago	12
San Francisco	8
New York	7
Los Angeles	12
Philadelphia	9
Dallas/Ft Worth	10
Toronto ON	9
Orlando	6
Seattle/Tacoma	6
Washington DC	7

[7] **National Geographic**, *Wildfore smoke makes Seattle and Portland world's dirtiest cities*

Latin America

Air pollution is one of this region's leading environmental issues, caused largely by industrial emission and fuels burned for household energy and transportation. Air quality and climate change are affecting vulnerable populations and natural areas, resulting in premature deaths, reduced crop yields and ecosystem damage. Organizations like the United Nations are encouraging governments to take action. In 2018, the U.N. released recommendations aimed at reducing short-lived climate pollutants in Latin America.

Zooming in on Mexico City

28th most traveled to destination worldwide*

2nd most popular destination within Latin America*

Air pollution levels are 120% higher than what scientists consider safe (22µg/m³ PM2.5)

* based on BCD Travel's global flight booking data from 2018

Mexico City is home to more than 8.8 million people, and air pollution is a major environmental and social concern.[8] The government launched comprehensive air quality management programs in the 1990s combining regulatory actions with technological change. Emissions decreased, and the city's residents and visitors now benefit from cleaner air despite continued population growth. A government website tracks air quality and reports on improvement.

Air quality in Latin America's top 10 destinations

Top 10 destinations	PM 2.5 in µg/m³
Monterrey	36
Mexico City	22
Sao Paulo	17
Santiago	29
Lima	39
Rio de Janeiro	11
San Juan	n/a
San Jose	24
Quito	18
Queretaro	n/a

[8] **Climate & Clean Air Coalition,** *August 13, 2018*

Air quality

Southwest Pacific

By world standards, the Southwest Pacific, including Australia, New Zealand and the South Pacific islands, has very clean air. But there is still work to do. Population growth, more people living in cities and growing demand for energy and transportation all threaten the region's clean air.

Zooming in on Melbourne

70th most traveled to destination worldwide*

2nd most popular destination within Southwest Pacific*

Air pollution levels are **90% higher** than what scientists consider safe (19µg/m³ PM2.5)

* based on BCD Travel's global flight booking data from 2018

Around 75%of Melbourne's air pollution is caused by vehicle emissions.[9] Cold, still winter weather can cause extreme air quality conditions, as happened in June 2018.[10]

Sydney generally has better air quality, although wildfires and hazard-reduction burns drive pollution to dangerous levels a few days a year.

Air quality in Southwest Pacific's top 10 destinations

Top 10 destinations	PM 2.5 in µg/m³
Sydney	8
Melbourne	8
Perth	8
Wellington	6
Canberra	16
Brisbane	7
Newcastle	8
Christchurch	n/a
Townsville	8
Gold Coast	n/a

Asia

Some of the highest recorded levels of air pollution are in Asia. Roughly 92% of the population—about 4 billion people—is exposed to air pollution that poses a significant risk to health. According to the Climate and Clean Air Coalition, continued economic growth and urbanization will worsen air pollution unless governments take more action. However, existing technology and policy solutions could bring cleaner air to 22% of the region's population by 2030.

Zooming in on Shanghai

7th most traveled to destination worldwide*

Most popular destination in Asia*

Air pollution levels are **350% higher** than what scientists consider safe (45µg/m³ PM2.5)

* based on BCD Travel's global flight booking data from 2018

Every year, more than 1.9 million people die from the consequences of air pollution in China.[11] Air quality in Beijing has long been considered the world's worst, but in 2018, economic hub Shanghai recorded pollution levels exceeding those of the Chinese capital.[12] Pollution is most extreme in Shanghai during winter. As temperatures drop, smog levels rise to such a degree that it's not uncommon for airlines to cancel flights for several days.

Air quality in Asia's top 10 destinations

Top 10 destinations	PM 2.5 in µg/m³
Shanghai	45
Singapore	18
Beijing	73
Delhi	143
Chennai	49
Shenzhen	27
Tokyo	17
Hyderabad	44
Manila	29
Taipei	22

[9] **Better Health Channel**
[10] **ABC News,** *June 28, 2018*
[11] **Breathlife**, *Air pollution in Shanghai, China*
[12] **Unearthed by Greenpeace**, *February 12, 2018*

Tips & tricks

Air pollution: practical tips and tricks

When considering travel risks, most companies think of obvious catastrophic events like terrorist attacks, hurricanes or airplane crashes. But business travelers are much more likely to encounter everyday risks: car accidents, travel disruptions, robberies or stolen data. Air pollution is often not included on the basic list of travel risks. But it should be.

BCD Travel advice to travel managers

In order to provide better duty of care, travel managers should include air pollution and air quality in their travel risk programs. They should also inform travelers at all stages in their trips:

1 Before

- ☑ Prepare travelers by sharing information about air pollution at their destinations and the potential health consequences. Supply them with tools to protect themselves as much as possible like masks, air quality monitors, etc.
- ☑ Make sure travelers are familiar with the company's travel policy on health and emergencies
- ☑ Check if extra insurance is necessary
- ☑ Consider shortening or even canceling trips to destinations where hazards and risks to health are high
- ☑ Offer virtual meeting alternatives

2 During

- ☑ When using a travel management app like TripSource, send notifications regarding local air quality forecasts and share tips to keep travelers safe and healthy

3 After

- ☑ Check with travelers if they suffered from any health issues related to air pollution
- ☑ Encourage them to share their experiences with o ther travelers
- ☑ Gather data on how long business travelers are exposed to what degree of air pollution; make recommendations to limit exposure to poor air quality

When visiting a destination with unhealthy-to-hazardous air quality, business travelers should:

- Aim to travel at times of the year when outdoor air quality is least affected by pollution.
- Familiarize themselves with their company's virtual meeting capabilities to reduce travel to high-pollution areas.
- Know their company's travel policy on health and emergency plans.
- Monitor the local Air Quality Index, weather websites and local media to understand whether they'll need to restrict activities or exercise indoors.[13]
- Use mass transportation and drive in enclosed cars in polluted areas.
- Consider wearing a properly fitted face mask (such as an N95 respirator, which filters most small particulates).
    - When worn properly, breathing effort is increased, so this may be a problem for people with underlying respiratory disease.
    - Masks do not filter gases such as ozone, nitrogen dioxide or sulfur dioxide.
    - In parts of the world where dangerous air quality is common, masks often are, too. Some are even fashionable.
- Consider wearing a personal air quality monitor to assess risks in real time.
- Opt for glasses, rather than contact lenses, when traveling to areas with polluted air—or pack plenty of saline solution.
- Exercise outdoors only early in the morning to lower potential exposure to pollution.
- Travelers with a medical history of lung or heart issues should discuss the following with their doctor:
    - The need to stabilize underlying health conditions before travel
    - Medications to carry (such as inhalers for asthma) and any necessary documentation for those medications (e.g., a medication letter to be used in customs)
    - The need to consider postponing discretionary travel because of truly hazardous air quality or choosing a different travel destination

How BCD products and services can help keep travelers safe:

- Traveling for business means exposure to potential risks such as political unrest, terrorist attacks, medical crises and air pollution. Virtual meeting alternatives can serve as an extension to a company's risk management plan and support duty of care responsibilities to keep travelers safe.
- No matter where travelers are, with My Company in TripSource® they can have quick access to their company's travel policy and contact information in case of an emergency.
- With Emergency Response, travelers on a trip receive a mobile alert on their phone about a crisis in their location and are prompted to check in using the TripSource® "I'm safe" button. Travel managers can monitor these messages in DecisionSource® and communicate with affected travelers until the crisis is over or the traveler is safe.
- Travel managers can use TripSource® to share relevant information and feedback with their travelers anytime, anywhere through company messaging, policy guidance and polls.
- Through BCD Travel's SolutionSource® platform, companies can partner with third-party risk management providers, including Anvil, International SOS and WorldAware, to expand and tailor corporate travel risk management programs to meet their unique business needs.

Alternatives?

Duty of care obligations and business objectives always need to be weighed carefully. Trips to destinations with hazardous air quality might be shortened or even avoided by using virtual collaboration tools. For inspiration, read a virtual collaboration case study, and ask your BCD contact for the right tools and best practices.

[13] aqicn.org, Real-time air quality index visual map

Useful links:

- World Health Organization: offers an overview of the current global situation and the consequences of air pollution
- Breathe Life Campaign: WHO's awareness campaign, offering insights and practical tips & tricks
- Air Quality Index: real-time overview of air pollution rates for the whole world
- Air pollution protectors:
  - N95 masks
  - Air quality sensors

Prepare travelers for air quality risks

***Ask how* BCD Travel can help your company prepare and protect your travelers from air quality risks**

"We feel strongly about supporting our clients in executing duty of care to their travelers. A good traveler security program is not only about addressing crisis situations like a terrorist attack, hurricane or earthquake, it's also about day-to-day risks like a car accident or exposure to pollution.

Employers who take action to mitigate the risks of air pollution send an important signal to their employees that they care about their wellbeing. With the enormous health effects of air pollution, we want to inform companies and their travel managers on how they can protect their travelers. Matching our own data with the World Health Organization's research, we created this report that makes it easy for travel managers to get informed about air pollution, find out if their travelers are at risk and plan how to act on it."

Martin Weisskirchen, Vice President of Technology Project & Global Crisis Management at BCD Travel.

Get to know the BCD Travel Research & Innovation team

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About BCD Travel

BCD Travel helps companies make the most of what they spend on travel. For travelers, this means keeping them safe and productive, and equipping them to make good choices on the road. For travel and procurement managers, it means advising them on how to grow the value of their travel program. In short, we help our clients travel smart and achieve more. We make this happen in 109 countries with almost 13,500 creative, committed and experienced people. And it's how we maintain the industry's most consistent client retention rate (95% over the past 10 years), with 2017 sales of US$25.7 billion. For more information, visit www.bcdtravel.com.