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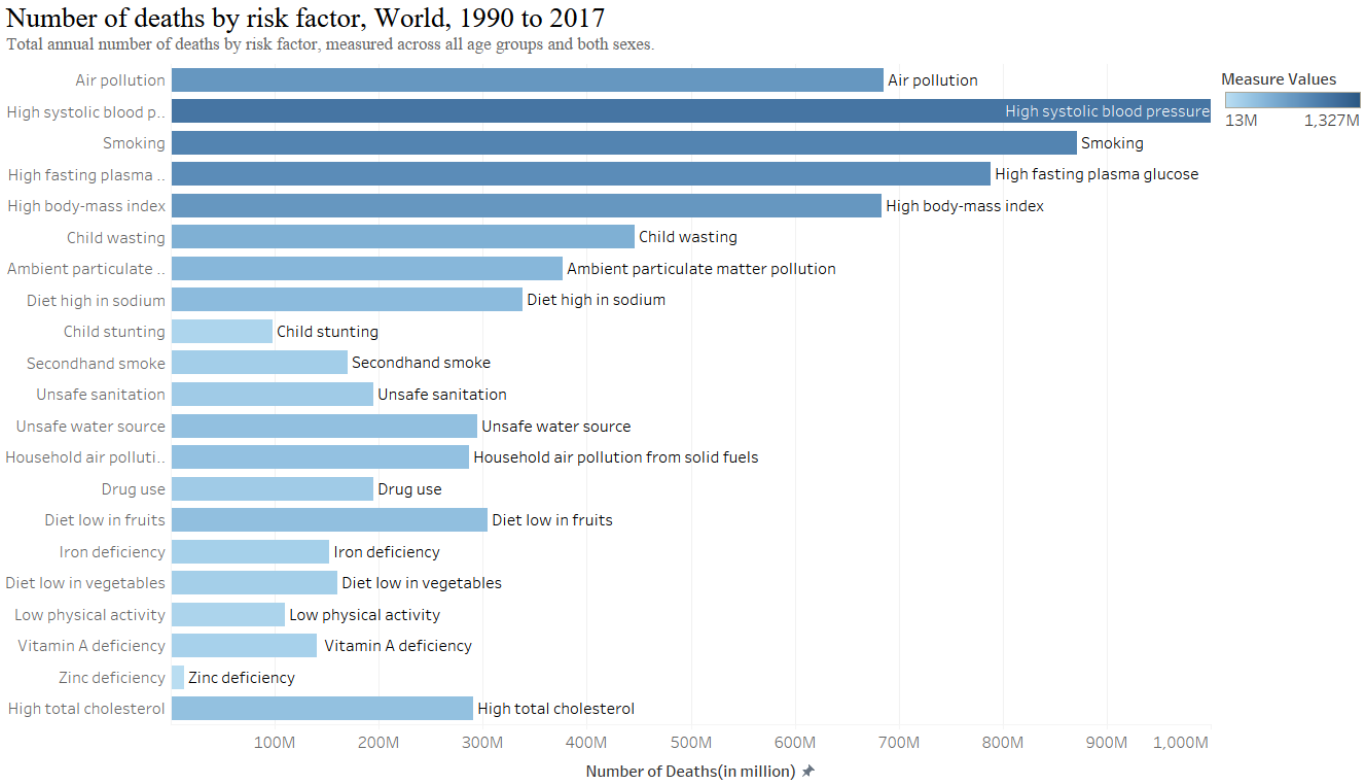
Air pollution

Air pollution is one of the most significant health and environmental problems globally. Air pollution (combination of outdoor and indoor particulate matter and ozone) is a risk factor for many important causes of death, including heart disease, stroke, lower respiratory tract infections, lung cancer, diabetes, and chronic obstructive pulmonary disease (COPD).

The visualization allows you to see the number of deaths per year assigned to each risk factor. This graph is displayed as a global total. Air pollution is one of the significant risk factors for death. In 2017, an estimated 5 million people died worldwide. This means that it contributed to 9% (almost 1 in 10).



Air pollution is a public health and environmental concern in every country, but the severity varies considerably.

We illustrate death rates from air pollution worldwide in the interactive map, which are calculated as the number of fatalities per 100,000 inhabitants in a particular country or region.

Death rates from air pollution in world,1990 to 2017

Death rates are measured as the number of deaths per 100,000 population from both outdoor and indoor air pollution. Rates are age-standardized, meaning they assume a constant age structure of the population to allow for comparisons between countries and over time.

Map based on Longitude (generated) and Latitude (generated). Color shows sum of Deaths by Air pollution. The marks are labeled by Country. Details are shown for Country. The view is filtered on Latitude (generated) and Longitude (generated). The Latitude (generated) filter keeps non-Null values only. The Longitude (generated) filter keeps non-Null values only.

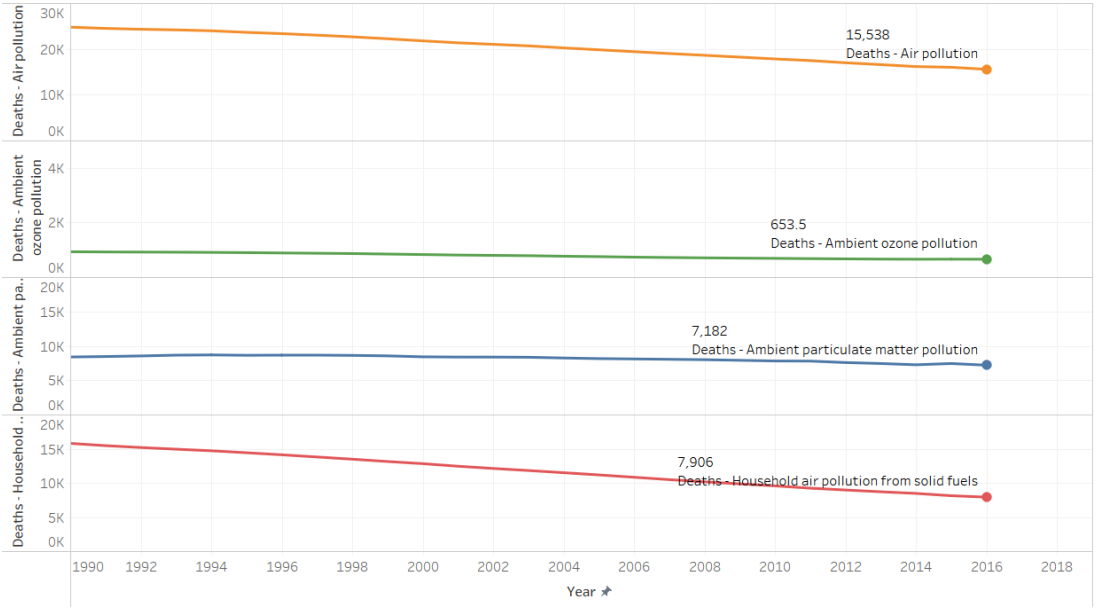
Death rates are highest in Sub-Saharan Africa and South Asia, as we can see. This highlights worldwide disparities: death rates in the nations with the most significant impact are more than 100 times higher than in much of Europe and North America.

Air pollution is more prevalent in low and middle-income countries for two reasons: low-income countries have higher interior pollution rates due to their reliance on solid fuels for cooking, and outdoor air pollution increases when countries industrialize and move from low to middle-income status.

Air pollution-related deaths are decreasing due to improvements in indoor pollution.

Death rates from types of air pollution, World, 1990 to 2019

In the visualization we show global death rates from air pollution over time – shown as the total air pollution, in addition to the individual contributions from outdoor and indoor pollution.



The visualization shows the global mortality from air pollution over time, as well as the individual contributions from outdoor and indoor pollution. This is shown as total air pollution. Globally, we see that overall air pollution mortality has declined in recent decades. Since 1990, the number of deaths per 100,000 inhabitants has almost halved. However, as the breakdown shows, this decrease is primarily due to improved indoor air pollution. Mortality from indoor air pollution has dropped significantly, but the improvement in outdoor air pollution is modest.

1. We look in detail at how exposure to Outdoor Air Pollution, its health impacts, and attributed deaths worldwide in our full entry: Outdoor Air Pollution.

2. We look in detail at the data and research on the health impacts of Indoor Air Pollution, attributed deaths, and its causes across the world in our full entry: Indoor Air Pollution.

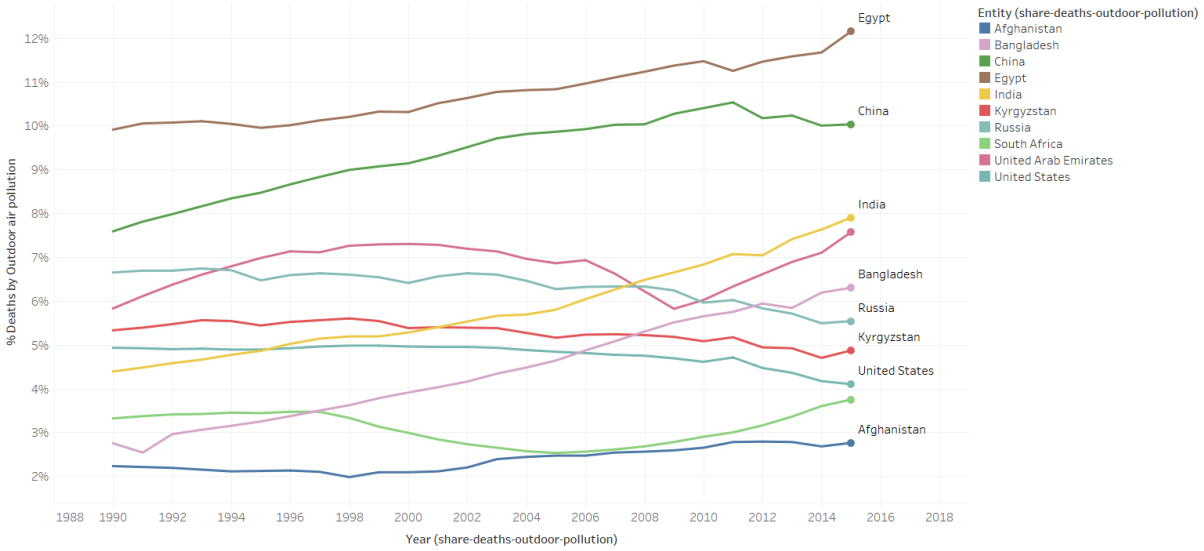
1. Outdoor Air Pollution

Outdoor air pollution is one of the world's most severe health and environmental issues, and it exacerbates as countries industrialize and move from poor to middle-income status. According to the Global Burden of Disease study, outdoor air pollution caused 3.4 million premature deaths in 2017.

6% of global deaths are attributed to outdoor air pollution

Share of deaths from outdoor air pollution, 1990 to 2017

More than 6% of global deaths are attributed to outdoor air pollution



The plot of sum of Outdoor air pollution (IHME, 2019) for Year (share-deaths-outdoor-pollution). Color shows details about Entity (share-deaths-outdoor-pollution). The marks are labeled by Entity (share-deaths-outdoor-pollution). The view is filtered on Entity (share-deaths-outdoor-pollution) and Exclusions (Entity (share-deaths-outdoor-pollution),Year (share-deaths-outdoor-pollution)). The Entity (share-deaths-outdoor-pollution) filter keeps 10 of 229 members. The Exclusions (Entity (share-deaths-outdoor-pollution),Year (share-deaths-outdoor-pollution)) filter keeps 6,409 members.

An estimated 3.4 million people died prematurely as a result of outdoor air pollution in 2017. This means that outdoor air pollution was responsible for 6% of global deaths.

In some countries, it accounts for 10% of deaths or higher.

On the map here, we see the share of annual deaths attributed to outdoor air pollution across the world. In 2017 this ranged from less than 2% across many countries in Afghanistan; 2-3% across the United States 4-6% across much of Russia.
At the highest end of the scale, around 1-in-10 deaths were attributed to outdoor air pollution. In Egypt, this share was 12%; in Turkey and China, it was 10%; and in India, it was 8%.

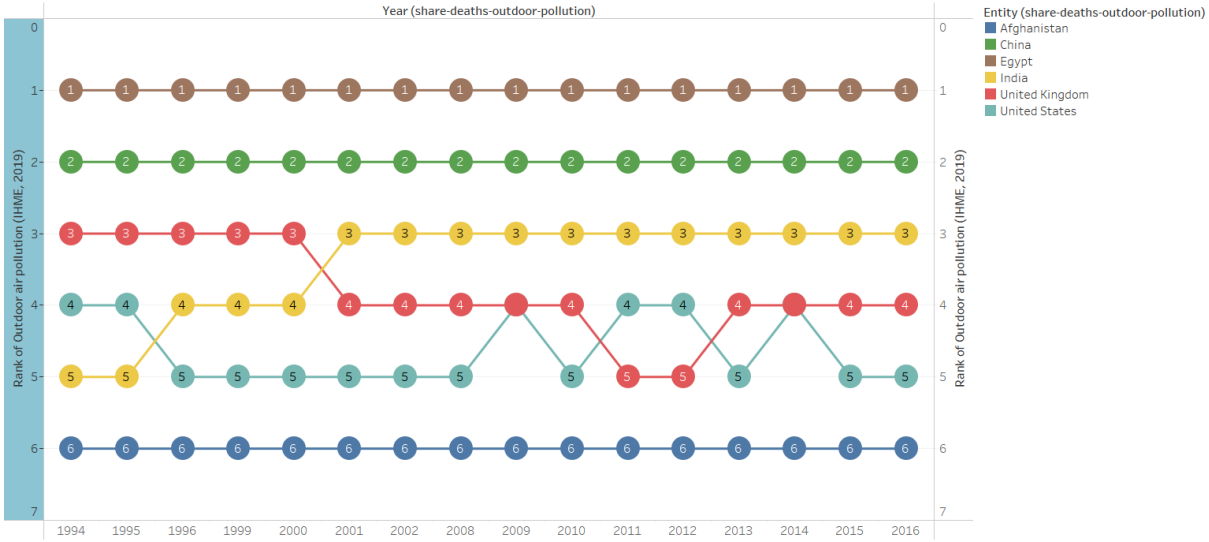
Concentrations of air pollution

Alongside ozone pollution, the main contributor to poor health from air pollution is particulate matter. In particular, microscopic particles of matter – termed 'PM2.5 ', which are particles with a size (diameter) of less than 2.5 micrometres (µm). Smaller particles tend to have more adverse health effects because they can enter airways and affect the respiratory system.

Pollution exposure is high in many of China and Egypt, the highest-ranked. Also we can observe that for the United Kingdom and India, there's a fluctuation in the rank because of population and industrialization.

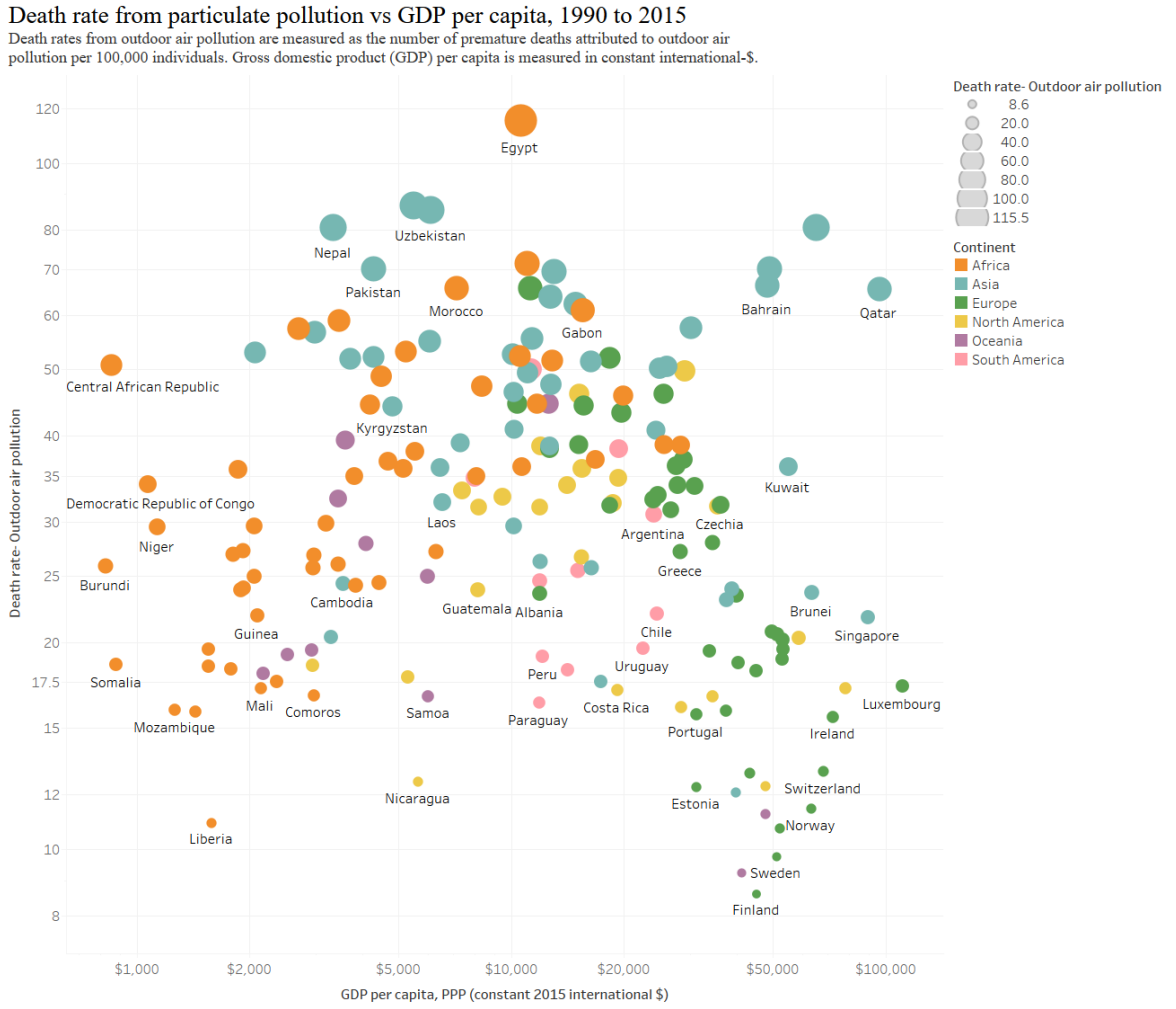
Exposure to air pollution with fine particulate matter (Death rates by rank)

Population-weighted average level of exposure to concentrations of suspended particles measuring less than 2.5 microns in diameter (PM2.5). Exposure is measured in micrograms of PM2.5 per cubic metre (µg/m³).



The trends of Rank of Outdoor air pollution (IHME, 2019) and Rank of Outdoor air pollution (IHME, 2019) for Year (share-deaths-outdoor-pollution). Color shows details about Entity (share-deaths-outdoor-pollution). For pane Rank of Outdoor air pollution (IHME, 2019) (2): The marks are labeled by Rank of Outdoor air pollution (IHME, 2019). The view is filtered on Entity (share-deaths-outdoor-pollution) and Year (share-deaths-outdoor-pollution). The Entity (share-deaths-outdoor-pollution) filter keeps 6 of 229 members. The Year (share-deaths-outdoor-pollution) filter has multiple members selected.

Outdoor air pollution tends to rise with industrialization before falling

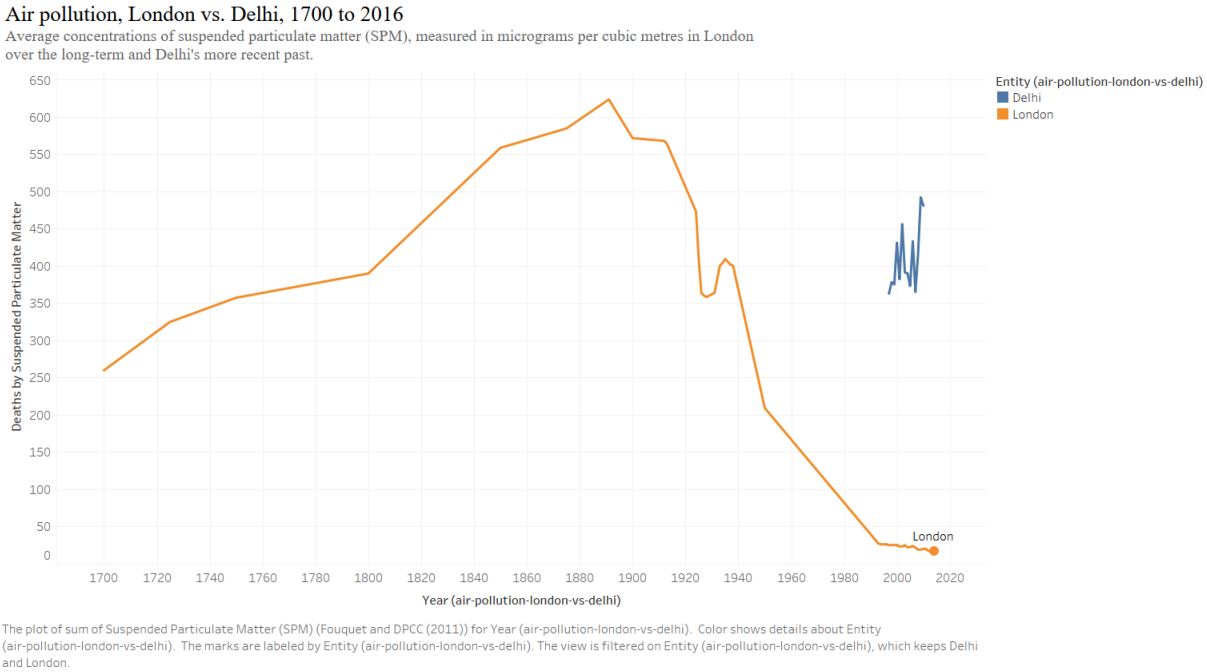


The visualization shows that it is in middle-income countries where the death rates from air pollution are highest. The evolution over time also shows an increase-peak-reduction shape.

The link between environmental degradation and economic development: environmental quality initially worsens with the onset of industrial growth but then peaks at a particular stage of economic development, and from then on, environmental quality begins to improve with increased development

This also appears to be reflected in the data when we look at death rates from outdoor air pollution versus income by country, as shown in the scatterplot here. We see that death rates tend to be highest around middle incomes – lower for low-income countries and low also in high-income countries. Countries with very high death rates – such as India, Egypt, Pakistan, and Nepal, are at low to middle-income levels.

The rise and fall of air pollution in London



Many of today's megacities are grappling with balancing development with air pollution. Dense cities have the difficulty of having more significant amounts of air pollution and exposing vast populations to its effects. According to historical statistics, this increase in pollution follows a pattern that is common in emerging cities. And it's one in which emissions peaked and then dropped substantially.

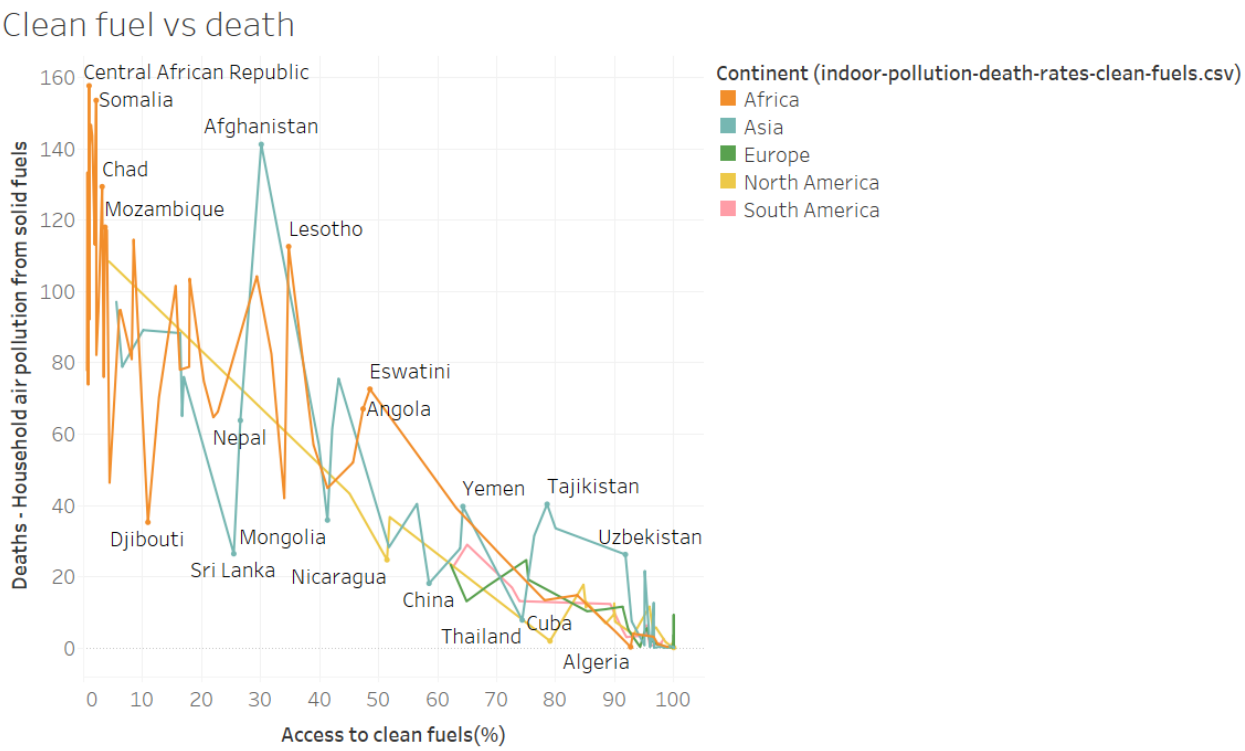
If we look at pollution levels in London over time, for example, we can easily see this 'Curve.' We plotted the average amounts of suspended particulate matter (SPM) in London's air from 1700 to 2016 in the visualization. Fine solid or liquid particles floating in Earth's atmosphere are referred to as suspended particulate matter (SPM) (such as soot, smoke, dust, and pollen).

As we can see, from 1700 to the present, London's air pollution has gotten worse decade after decade. The amount of suspended particle matter in London's air has doubled in the last two centuries. However, at the very end of the nineteenth century, the concentration peaked and then began a precipitous decrease, with current levels about 40 times lower than they were more than a century ago.

To put today's developing megacities into context, we've included pollution levels in Delhi, India. Pollution in Delhi is far greater today than it is in London, although it is comparable to levels seen during London's rapid industrialization phase. The primary point is that city pollution is not unprecedented in history – and we know that when populations grow, pollution levels peak and then drop. However, in order to effectively address the substantial health burdens posed by air pollution today, we must find ways to speed up this process for low- and middle-income countries.

2. Indoor Air Pollution

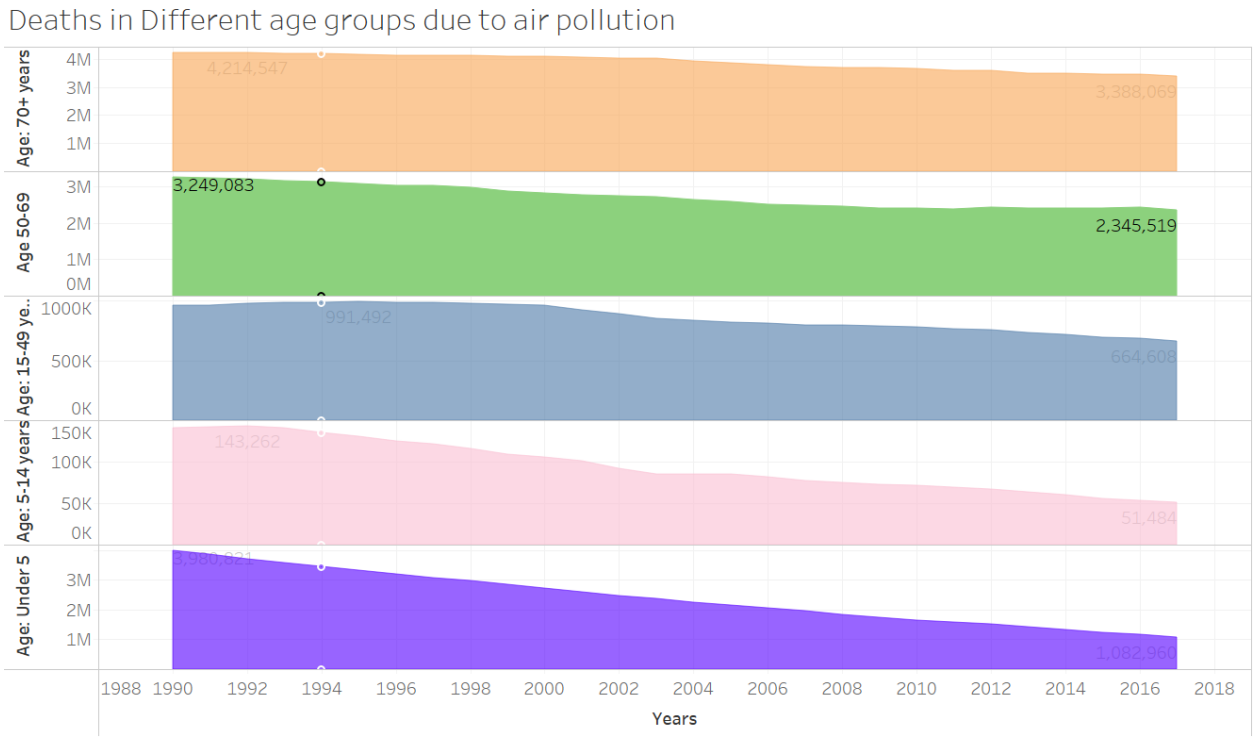
Indoor Air Pollution vs Access to clean fuels



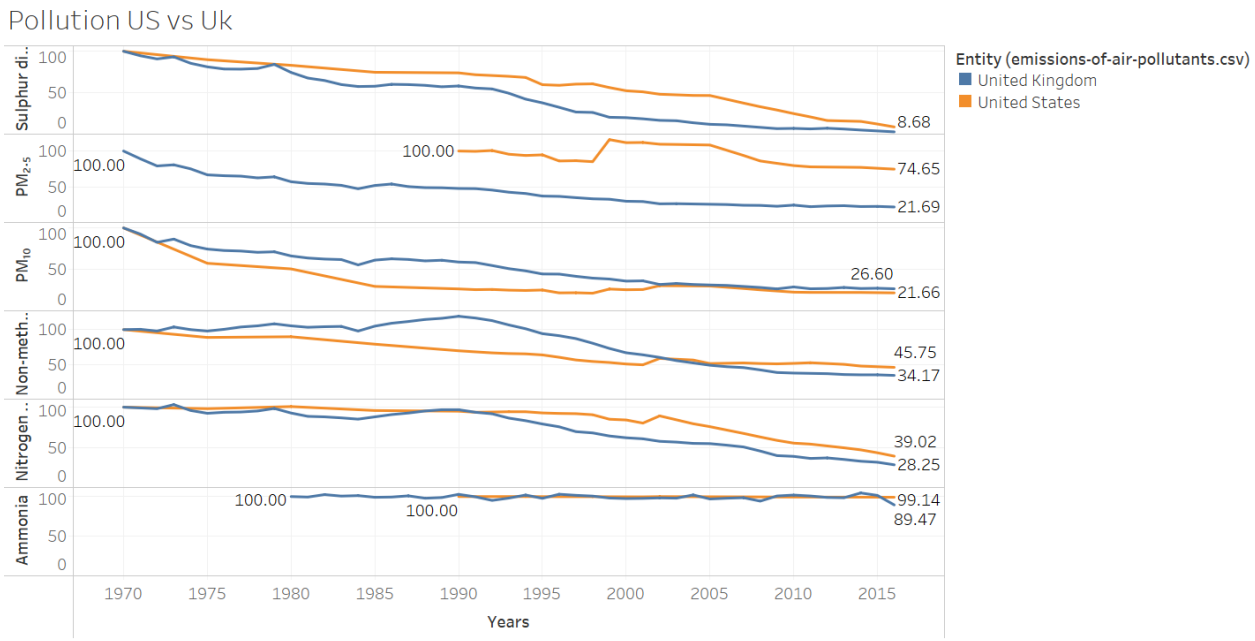
Indoor air pollution is generally due to lack of availability of clean cooking fuels. The burning of substitutes is a major cause of indoor pollution. The households of poor countries generally don't have access to clean fuel. Hence the death rates in such countries is higher.

Indoor Air Pollution vs Access to clean fuels

The below graph depicts the decline of death rates across all the age groups over the years due to indoor air pollution. We can clearly see that the indoor air pollution is decreasing due to availability of cleaner cooking fuels over the years.



Decline in Air Pollution due to different particles in United Kingdom and United States



We can clearly see the air pollution is decreasing over the years in United Kingdom as well as United states from the year 1970 to the year 2015.The decrease is significant for all the particles except ammonia.