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## A Study on the Correlation Between Changes in Air Pollution and Water Sources

The developed country to be researched is the U.S. and the developing country is South Africa. This research will mainly focus on the pollution in the waters and the air of the cities, whether it be from the big industries or the citizens themselves, and how this all relates to the respiratory system of the people living in these cities. Several studies have revealed a correlation between changes in air pollution and water sources and respiratory issues in both countries. The source of such pollution, how it is effecting the respiratory system, and what changes between policy makers and individuals could be made to help decrease the risks will all be addressed.

The different types of air pollution in major cities can aggravate people's breathing, promote asthma symptoms and ultimately cause lung and heart diseases. Asthma and lung cancer can be attributed to the second-hand tobacco smoke in the environment as well. Industrialization and urbanization has called for the burning of huge amounts of natural gas, fossil fuel, and coal. All these occurrences have been releasing toxic pollutants into the air we consume. To help improve air quality, The Clean Air Act was successfully passed in the United States in 1970. The Clean Air Act is a U.S federal law aimed at containing air pollution on a national level. The Environmental Protection Agency (EPA) is required by this law to protect us from any hazardous airborne contaminations that could threaten the public health. Nonetheless, health issues due to air pollution are still a major problem [16]. In the study Health effects of air pollution on length of respiratory cancer survival, the authors organized a study based on population to analyze whether being subject to air pollution has harmful impacts on the survival rates of cancer patients in Los Angeles, California (Xu, Kan, Ha, Curbow, Lissaker, 2013). Los Angeles is one of the most polluted cities in the United states and respiratory cancer is one of the most commonly diagnosed and cause of death in cancer (Anne G Wheaton). The study concluded all respiratory cancer patients notably had higher mortality rates and lower survival rate than of those residing in less polluted environments. Another study in 2001 was conducted in San Francisco, California focusing on the effects of traffic in congested roads on the environment and how it all contributes to respiratory health issues (Kim, Smorodinsky, Lipsett, Hodgson, Ostro, Singer, 2004). Traffic pollutants such as black carbon, nitrogen dioxide, and total nitrogen oxides were tested for throughout various seasons in ten different schools in the city. Pollutant concentrations were reasonably low, but there were still some concentrations discovered. Among the schools that are closer to busier roads, more pollution that is associated with the cause of asthma was found. One of the most effective ways to reduce or prevent such risks of respiratory health problems is to put in place policies that would help promote cleaner air quality.

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The United States House of Representatives has passed the Dust Act which would excuse most types of atmospheric pollutants in rural areas from air quality controls which is included in the Clean Air Act (Center, Colson, 2013). This will ultimately restrict individuals or businesses from releasing pollutants into the environment that can result in health issues [2]. This new act would dramatically help improve the standard of U.S air quality overall. In South Africa, the use of electric vehicles has been proposed by policymakers in the effort to help minimize greenhouse gas emissions. However, this study revealed that the majority of South Africa's electricity is produced from coal of reasonably low quality. The modern technologies that clean up exhaust are not being enforced in the power plants so the utilization of electric vehicles in South Africa would not do much to help reduce the issue of greenhouse emissions. In comparison to South Africa, the U.S has clean electricity grids used to make these cars and such a resource is vital to the full potential of electric vehicles (Xinying, Hildebrandt, Glasser, 2012).

The issue of air pollution doesn't just come from outside but can come indoor from homes. The study in Household energy, indoor air pollution and child respiratory health in South Africa analysis claims of a connection between indoor air pollution and respiratory infections in children (Barnes, Mathee, Thomas, Bruce, Feb. 2009). Indoor air pollution contributes to about 1,400 deaths among children every year [1]. Many families in the developing country of South Africa, which again is not as advanced in technology, rely heavily on domestic use of coal, wood, and crop residue to fuel their energy [2]. When these fuels which are burned in homes in open fire or even basic appliances, partial combustion of biomass fuels allow for the escape of toxics like carbon dioxide, sulphur dioxide, carbon monoxide, and oxides of nitrogen. Vulnerability to such toxics has been linked to lung cancer, tuberculosis, chronic obstructive pulmonary disease (COPD), and lower respiratory infections in infants [2].

Whether it is a developing or developed country, as seen in these studies, there will always be man created pollution that is constantly contributing to the respiratory health issues (Auty, July 1997). Some of the causes of pollution, or mainly air pollution can be smoking, traffic congestions, and the pollutants that can come from industrialization and urbanization in general. One country is more advanced than the other, but consequently, both are rapidly growing in urbanization, transportation, and industrialization expansion within the past few decades. With that comes resources that can and do release harmful toxics to the environment, which again, is consequently responsible for the biological health risks. Although, modern technologies and resources are not always the cause. In developing countries like South Africa, the lack of modern technology results in the use of harmful ways to cater to domestic needs by creating indoor pollution and can cause sickness or even death amongst those around it. There are many proposals both countries can prevent to provide solutions to these environmental issues. One of the most effective first steps to take is create policies that limit individuals, big factories and power plants from releasing harmful toxic air pollutants. Each person can also take initiative

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