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Solution to Pollution: An Attack on Asthma

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How many people in the U.S. have asthma?

About 1 in 13 people



The Source: 2010 National Health Interview Survey

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NURS 424: Nursing Leadership & Management

Professor Blomquist and Professor Walters



Because of poorly controlled asthma, each year about



When you control your asthma, you can lead a full and active life. You deserve nothing less!

The Source: 2010 National Health Interview Survey

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Bird's Eye View Proposal Details

Who has recognized the problem?

→ The World Health Organization identifies asthma as a major noncommunicable disease affecting 262 million adults and children globally, causing over 460,000 deaths in 2019 (WHO, 2021)

How long has this been going on?

→ The CDC recognizes that millions of Americans suffer from asthma related healthcare difficulties; this is particularly true in communities with inequitable healthcare access
→ The CDC has created a "National Asthma Control Program" which aims to help with "asthma treatment, management, and control" (CDC, n.d.)

Social Determinants of Asthma

Prevalence

→ At least 10 Americans experience asthma-related deaths each day (AAFA, n.d.)

Health Disparities

→ Black Americans are five times more likely to go to the emergency room for asthma-related incidences and five times more likely to experience asthma-related deaths compared to white Americans (AAFA, n.d)

Economic Costs

→ From 2008-2013, Americans paid an estimated \$50.3 billion dollars in medical costs related to asthma, which is only expected to increase (Nurmagambetov et al., 2018)

→ The high cost of asthma medications heavily impacts people of lower socioeconomic status because they are less likely to have health insurance coverage

Environmental Inequalities

→ Increases in outdoor air pollution have caused increased rates of pre-existing asthma exacerbations, especially in urban populations with higher rates of both asthma and air pollution (Guarneiri & Balmes, 2014).

→ People of lower socioeconomic status are more likely to live in concentrated urban neighborhoods with higher rates of bad air quality

PERSONAL AIR POLLUTION MONITORING DEVICES

What are they?

→ Low-cost portable pollution sensors that can be carried or worn by an individual during their normal day-to-day activities. They can help prevent asthma exacerbations.

Why is this significant?

→ Air pollution is extremely harmful to global health, but it is particularly detrimental those with underlying conditions such as asthma.
→ These individuals are disproportionately affected by the fine particulate matter (PM 2.5's), nitrogen dioxide, ozone, carbon monoxide, and traffic related air pollutants and can trigger exacerbations of the disease (Xie et al., 2021)
→ The Environmental Protection Agency (EPA) utilizes highly sensitive and effective air monitors, but they are not well suited to individual needs due to their locations not coinciding with the locations that exposures typically occur such as home, work, and school
→ Personal air monitoring devices can measure pollution levels in all the places that the EPA's stationary monitors can't

→ They can help people with asthma control exacerbations, especially those living in disadvantaged areas with higher levels of pollution

How can we take action?

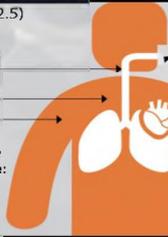
1. Contribute to asthma research by conducting structured interviews with adults with asthma to see if they'd be willing to use a personal air monitoring device
2. Conduct a study in a city with high pollution rates where half of the participants are given personal air monitoring devices and the other half must rely on the data from the EPA's stationary monitors. Compare and contrast the results. Ask the question: do these devices help prevent asthma exacerbations?
3. Consider asking a large research group with more resources to conduct a study, that could then be presented to the appropriate people to begin the FDA approval process
4. In due time, make personal air monitoring devices available to patients with persistent asthma. This could be something they are given at their primary care provider's office, or even sent home with after a hospital stay like an incentive spirometer
5. Include personal pollution monitors into an asthma plan of care: how to track symptoms and triggers, how to take your medications, what to do when you have an attack, when to see your provider, and what to do when the air quality could trigger an exacerbation.

Fine particles (PM 2.5) pollution can cause:

- Shortness of breath
- Wheezing, coughing
- Chest pain
- Fatigue

Fine particles can make these conditions worse:

- Cardiovascular and heart disease
- Asthma and COPD



Ground-level ozone pollution can cause:

- Difficulty breathing deeply
- Shortness of breath
- Sore throat
- Wheezing, coughing
- Fatigue

Ozone can make these conditions worse:

- Asthma and COPD
- Emphysema

Proposed Solutions

Applicability of the Proposed Solution

→ With the proper research action, implementing personal pollution monitoring devices should be a new normal in patients suffering from severe asthma.

Potential Implementation Issues

→ The problem that could be encountered involves insurance coverage of these devices. By advocating to implement these devices, insurance companies could start developing and encouraging preventative care. This will then progress the idea of preventative care and better the health of populations.

Moving Forward

Further Innovation in Health Equality or Research

→ The proposed solution could spark research regarding preventative measures for chronic respiratory illnesses such as asthma, thus decreasing the great need for treatments locally, nationally, and globally

What happens next?

→ Recognition of safety devices for upstream, preventative health measures would encourage similar initiatives with various healthcare related issues
→ Advocating for FDA approval and insurance coverage of preventative healthcare devices could move insurance companies in the direction of encouraging preventative care coverage
→ Rallying for equitable healthcare coverage will reduce costs in healthcare spending, improve the lives of those with asthma and other chronic illnesses, and reduce the need for downstream pharmacological interventions and therapies
→ While a personal pollution monitor cannot solve the systemic issues that face our healthcare system, they can aid in improving the lives of individual people, children, and thus their communities
→ In time, see less strain on the healthcare system and less children and adults affected by asthma

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