

# Reducing Childhood Asthma Exacerbations

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SPRING 2018



# Introduction (continued):

Childhood asthma - the most common chronic disease affecting children in the United States

Affecting 8.4% of American children (CDC, National Center for Health Statistics: Asthma, 2018)

"the prevalence and morbidity of asthma among children in the United States have increased dramatically over the past 3 decades," which leads to "205,000 pediatric hospitalizations and 697,000 emergency department visits each year" - (Krieger, 2010)

14 million school days are missed each year because of asthma exacerbations





# Methods

Databases utilized:

PubMed Central

Web of Science

Key words: asthma, childhood asthma, asthma triggers and solutions

Excluded older than 2005 or those that did not pertain to topic

# Methods

Seven articles were reviewed

- Described asthma triggers

- Described effective prevention methods

- Identified the role of public health officials

# Results

	Airway inflammation due to exposure	Allergic
	Bronchospasm	Non-allergic



# Discussion

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More than 92% of American homes contain concentrations of one or more allergen and 46% of homes contain three or more (Krieger, 2010).

Feasible to reduce exposure to indoor allergens utilizing prevention techniques, which improves clinical outcomes and decreases asthma exacerbations (Krieger, 2010).

"Preventive methods focus on environmental management to control asthma triggers" (Homer, 2008).

# Discussion

## Tobacco Smoke – Secondhand Smoke

Secondhand tobacco smoke – the most common asthma trigger for children

Defined as “smoke that has been exhaled, or breathed out, by the person smoking” (CDC, Secondhand Smoke Facts, 2017).

Over 50% of children diagnosed with asthma are exposed to tobacco smoke (Kanchongkittiphon et al, 2014).

Over 60% of children diagnosed with asthma have a mother or caretaker who smokes (Kanchongkittiphon et al., 2014).

Best method against tobacco smoke exposure - tobacco cessation

Pharmaceutical treatment or nicotine replacement found successful

If smoking cessation is not possible or successful, smoking should not occur in the home, in the car, or near open windows and doors leading to the interior of the building, especially not on child care center and school premises

Tobacco smoke possesses solid particles, semi volatile, and volatile organic compounds that are known to

# Discussion

## Tobacco Smoke – Thirdhand Smoke

Defined as “residual nicotine and other chemicals left on indoor surfaces by tobacco smoke” (Mayo Clinic, 2017).

Children exposed to thirdhand smoke by touching a contaminated surface or breathing in the toxins from the surface (Mayo Clinic, 2017).

Thirdhand smoke’s chemicals and toxins linger on surfaces and settle in dust that can persist for weeks (Kanchongkittiphon et al., 2014).

Need for thirdhand smoke policies in child care centers, schools, and facility vehicles – public health assistance, if needed

Encourage referrals and ways to quit smoking for parents as well as staff to protect the health of children (AAFA, 2012).

In “Parental Perceptions and Practices toward Childhood Asthma,” 80.3% of participants used precautions, such as avoiding smoking indoors (Abu-Shaheen et al., 2016).

Use of combination of precautions resulted in improved quality of life of the children as well as decreased asthma exacerbations

# Discussion

## Strong Odors

Strong odors - asthma trigger due to large quantities of

# Discussion

## Pests

Pests and their excrement can cause asthma attacks (CDC, 2010).

Recommended to remove all food and water sources for pests, vacuum and/or sweep every two to three days to remove crumbs and other food particles that attract the pests (CDC, 2010).

Pest allergens found in corners, behind furniture, under sinks, along window sills, and especially in dark, wet areas

Can be present in schools if there are issues with kitchen cleanliness, food storage, and water damage.

A study completed by Sheehan et al. (2017) demonstrated that inner-city school children in the Northeastern US missed school more often due to asthma-related issues when there were greater levels of mouse allergen exposure in their homes and schools.

High levels of cockroach allergens in homes, especially children's bedrooms, which is a large concern for causing asthma exacerbations (Kanchongkittiphon et al, 2014).

Study conducted in inner city homes, "Home environmental intervention in inner-city asthma: a randomized controlled clinical trial," provided 84% of the experimental households with cockroach extermination, which resulted in a 51% decrease in cockroach allergen levels (Eggleston et al, 2005).

# Discussion

## Pets

Pets - dander, excrement, urine, and saliva - asthma triggers

Mainly consist of pets with fur, such as dogs, cats, hamsters, guinea pigs, and rabbits (Kanchongkittiphon et al., 2014).

No scientific evidence to support the existence of hypoallergenic pets (Kanchongkittiphon et al., 2014).

All mammals, at this time, are thought to be sources of allergens

Interventions to reduce the impact of pets as an asthma trigger

Pets should not co-sleep with children with allergies, especially if they have been diagnosed with asthma (CDC, 2010).

Bathing of the animal every week (CDC, 2010).

Wall-to-wall carpeting and upholstered furniture should be vacuumed weekly

If there is no carpeting, damp mop weekly (CDC, 2010).

In schools and child care centers, classroom pets include mice, gerbils, hamsters, birds, and rabbits as well as therapy animals

Best recommendation - remove animals from the child care center and implement a "no pet policy" (WAC, School Walkthrough, Guidebook, 2015).

If animals are desired, recommendations include allowing fish, butterflies, and reptiles into the classroom (WAC, School Guidebook, 2015).

Keep animals in their cages and away from fabric objects in the classroom, especially away from sleeping areas and items (Kanchongkittiphon et al., 2014).

# Discussion

## Mold

Moisture causes mold; whose spore are an asthma trigger.

Mold - multicellular fungus that rapidly grows on wet surfaces (WAC, page 20).

High level of mold spores have been found in homes as well as schools (Kanchongkittiphon et al, 2014)

Positive correlation between visible mold in homes and airway-related symptoms and allergic diseases in the children who participated in the cross-sectional study (Weber et al, 2017).

Breathing in mold spores can cause asthma exacerbations.

Mold growth can be controlled through an air conditioner or dehumidifier (CDC, 2010).

Humidity levels should be no higher than 50% in the home (Kanchongkittiphon, 2014) to reduce mold growth.

Found on walls, on ceilings, under flooring, in appliances, in bathrooms, on plants, on window sills, and in and around sinks (WAC, page 10).

Prevent mold growth:

Bathrooms and surfaces exposed to moisture cleaned with a diluted bleach solution and dried regularly

source of moisture and water leaks should be identified and then fixed

Use exhaust fans, or other ventilation in areas where moisture is generated, such as bathrooms and kitchens (Kanchongkittiphon, 2014).

Limit when windows are open, such as days with high outdoor mold counts (AAFA, 2012).

Cleaning and replacing furnace and air conditioning filters regularly (AAFA, 2012)

Position refrigerators and free-standing freezers away from carpeting and on mats or trays to catch any leaking water (WAC, School Walkthrough Guidebook, 2015).



# Discussion

## Dust Mites

Dust mite allergens found within the fecal matter (Kanchongkittiphon et al., 2014).

Found anywhere dust accumulates: in upholstered furniture, stuffed animals, pillows, wall-to-wall carpeting, and window treatments.

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# The Role of Public Health Officials

The WAC created a WAC home walkthrough program

The goal of the walkthrough "to improve the quality of life and management of asthma by reducing environmental asthma triggers found within the home" (WAC, Wisconsin Asthma Plan, 2015).

Unfortunately, no longer being funded; however, the concepts

# Conclusion

Childhood asthma - affects thousands of children in the United States

Common asthma triggers include:

- Tobacco smoke

- Dust mites

- Pests

- Pets

- Mold

- Strong odors

Based on the findings of the literature review - if physical prevention techniques are utilized to combat common asthma triggers, positive outcomes, such as decreased asthma exacerbations, missed school days, hospitalization, and mortality and morbidity rates of children could be achieved.

Physical prevention methods were also identified:

- Removing carpeting

- Smoking cessation

- Utilizing effective cleaning methods

- Repairing water incursions

Public health officials - play an essential role in educating and encouraging parents, teachers, and caregivers on asthma triggers and how to prevent childhood asthma exacerbations. By reducing childhood asthma exacerbations, the quality of children's lives is greatly improved.

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