Introduction to Indoor air quality and asthma triggers

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Indoor Air Quality

- Indoor Air Quality (IAQ) refers to the air quality within and around buildings and structures, especially as it relates to the health and comfort of building occupants. (EPA)

- Americans spend about 90% of their time indoors where the concentrations of some pollutants are often 2 to 5 times higher than typical outdoor concentrations (EPA).

Indoor Air Quality

What does 90% of time indoors look like?

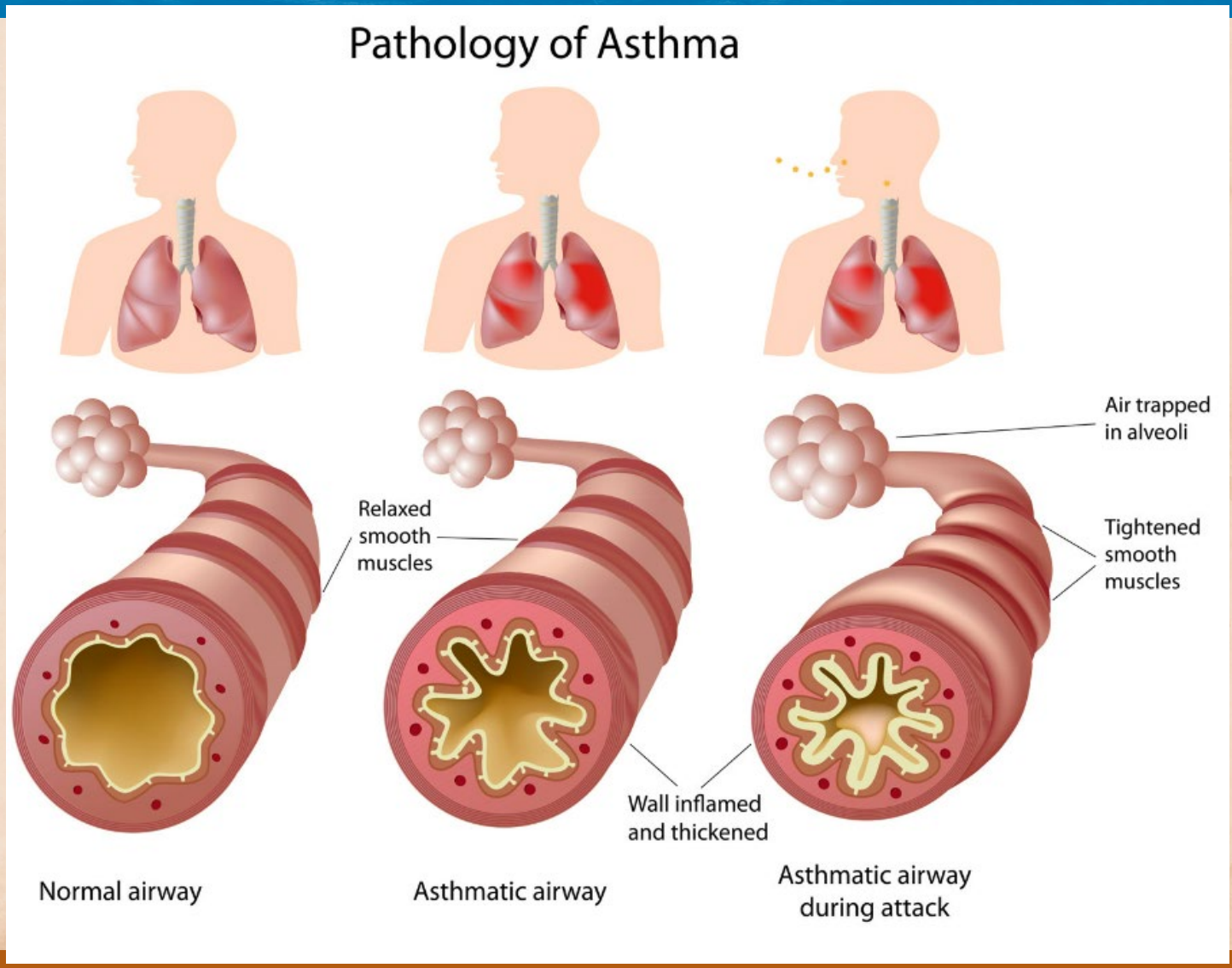
Total time	90% of total time
24 hours in a day	21.6 hours
365 days in a year	328.5 days
8,760 hours in a year	7,884 hours

By 80 years old, this is 72 years indoors!

How does Indoor Air Quality and Asthma Relate?

- **Asthma** is a chronic condition in which your airways narrow and swell and may produce extra mucus. This can make breathing difficult and trigger coughing, a whistling sound (wheezing) when you breathe out, chest tightening, and shortness of breath (MayoClinic).
- Environmental factors can act as asthma triggers
- Rate of asthma is almost double in Tribal populations compared to national average (CDC).

How does Indoor Air Quality and Asthma Relate?



Source: charlestonallergy.com

Asthma

- Most common factors for **developing** asthma:
  - Having a parent with asthma
  - Having a severe respiratory infection as a child
  - Having an allergic condition
  - Exposure to certain chemical irritants or industrial dusts in the workplace.

- Other possible risks that **increase** asthma development:
  - Family history of asthma
  - Allergies
  - Viral respiratory infections
  - Occupational exposures
  - Smoking
  - Air pollution
  - Obesity

Source: American Lung Association

Identifying Asthma Triggers

Obvious Triggers

- Pollen
- Dust mites
- Smoke
- Mold
- Pet dander
- Chemicals (Pesticides)
- Pest allergens (cockroaches)
- Particulate matter

Not So Obvious

- Stress
- Candles
- Perfume
- Fragrance or strong odors
- Strong emotions
- Some additives in food

Symptoms of Indoor Air Pollution

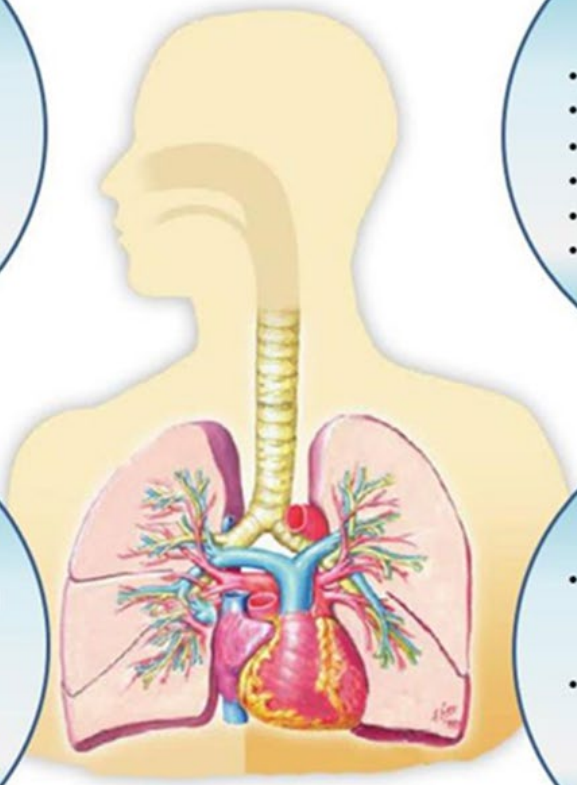
- Poor Indoor Air Quality can cause other symptoms such as:
  - Irritation of the eyes, nose, and throat
  - Headaches
  - Dizziness
  - Fatigue
  - Worsening asthma or allergies
  - Shortness of breath
  - Sneezing/coughing

Health Impacts from Inadequate Air Quality

Known Health Impacts from Air Pollution

Cognitive Function
- Accelerated cognitive decline
- Decreased short term memory
- Poor brain development in children
- Other cognitive disorders among children and adults

Cardiovascular System
- Congestive heart failure
- Coronary artery disease
- Abnormal heart rhythms
- Increased vascular plaque build up
- Increased vascular clot risk
- Thinning of arterial walls



Respiratory System
- Narrowing of airways
- Increased asthma, bronchitis, and emphysema
- Premature aging of lungs
- Inflammation of the airways due to abnormal influx of mucus and white blood cells

Other Concerns
- Diabetes, obesity, reproductive system dysfunction, and preterm birth
- Cancer of the lungs, blood, kidneys, prostate, and other systems

Indoor Air Pollutants

- Combustion byproducts:
  - carbon monoxide
  - particulate matter
  - environmental tobacco smoke
- Radon, pet dander, and mold
- Pesticides, lead, and asbestos
- Ozone (from some air cleaners)
- Various volatile organic compounds (VOCs) from a variety of products and materials

Indoor Pollutant Sources

Indoor Pollutant Sources

Combustion sources releasing carbon monoxide and particulate matter:

- Tobacco
- wood and coal heating cooking appliances
- and fireplaces

Volatile organic compounds and other chemicals:

- Cleaning supplies
- Paints
- insecticides

Natural Origin:

- Radon
- Mold
- Pet Dander

Other:

- Building materials
  - Asbestos
  - Chemical off-gassing

Pollutant Pathways

- **Pollutants can enter building through various pathways:**
  - Open doors/windows
  - Ventilation systems
  - Openings in structures
  - Through building foundations (radon)
  - Individuals/pets tracking pollutants inside

Mold and Moisture

- Mold is a fungal growth that forms in moist, warm areas with poor ventilation. It needs moisture and typically a carbon source to grow

- Mold forms spores that disperse through the air to form new colonies

- Mold Remediation:
  - Identify and eliminate source of moisture
  - Ventilate and dry the area
  - Use PPE: N95 respirator, gloves, goggles
  - Clean the mold from non-porous areas with water and detergent
  - Dispose of any items that are not able to be cleaned (porous surfaces)
  - Seek professional assistance

Hgtv.com

Indoor Air Quality and Pests

- Feces, saliva, and body parts of pests (i.e. cockroaches) can act as asthma triggers

- Pests allergens can be a significant trigger in urban communities

- Indoor Pest Mitigation:
  - Keep surfaces clean and free of clutter, food, and moisture
  - Keep dishes clean
  - Keep food securely contained and not accessible
  - Keep food inside cabinets or contained with no cracks or openings
  - Keep trash contained, dispose of it often

Source: epa.gov

Wildfires

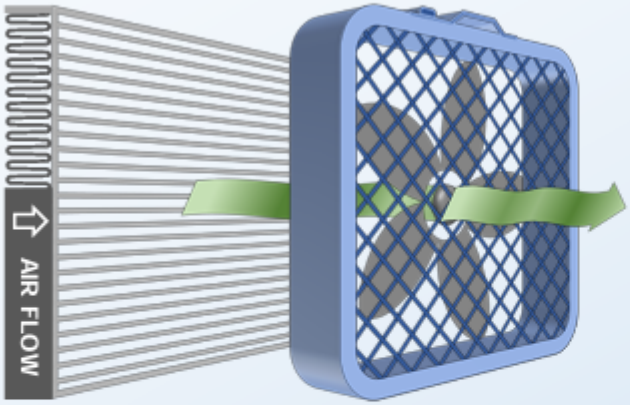
- Smoke can enter homes through various pathways
- Reduce the smoke that enters your home
- Mitigation:
  - Keep windows and doors closed
  - Use fans and air conditioning to stay cool
  - Set your HVAC system to recirculate mode, or close the outdoor intake damper
  - Avoid adding more fine particles indoors
  - Use a portable air cleaner
  - Avoid strenuous activity
  - Wear N95 respirator

Source: epa.gov

Wildfires

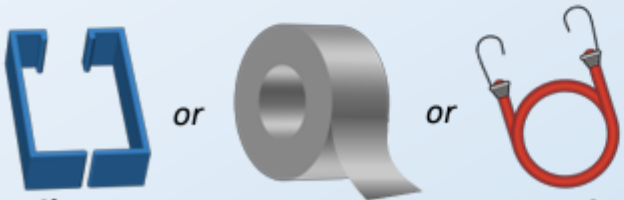
DIY Air Cleaner to Reduce Wildfire Smoke Indoors

Materials



20" X 20" air filter
Suggested rating: MERV 13

20" X 20" box fan
Only use certified fans with UL or ETL marking (2012 model or newer)



Clamps or **Duct Tape** or **Bungee Cords**

Assembly

1. Attach the air filter to the back of the box fan using either clamps, duct tape or bungee cords.
2. Check the filter for the direction of the air flow (marked on the side of the filter).
3. Replace filters when dirty.

Learn about box fan safety tips:
https://www.epa.gov/air-research/research-diy-air-cleaners-reduce-wildfire-smoke-indoors#FAQ

Source: epa.gov

Reading Labels on Products

Onyx Professional 100% Pure Acetone Maximum Strength

READ INSTRUCTIONS CAREFULLY BEFORE USING.
INSTRUCTIONS: TO REMOVE ARTIFICIAL NAILS: Clip excess artificial nails with nail clipper. Fill glass bowl with acetone. Place fingers in bowl and allow to soak for 15 minutes. Repeat if necessary. TO REMOVE GEL POLISH: Fill glass bowl with acetone. Place fingers in bowl and allow to soak for 15 minutes. Repeat if necessary. Trouble areas may require use of sanding block and/or manicure sticks to remove polish. Repeat if necessary.
TO REMOVE NAIL POLISH, GLITTER, NAIL ART OR GLUE: Moisten cotton ball and massage nail bed, pressing firmly from cuticle to nail tip. Wipe clean and repeat if necessary.

WARNING: KEEP AWAY FROM CHILDREN. Danger! Flammable.
Keep away from heat, sparks, and flame. Do not use while smoking. Store at room temperature. Do not breathe in vapors. Use only with adequate ventilation. Harmful if taken internally. If ingested, seek medical attention immediately and contact a local poison control center. In case of eye contact, immediately flush eyes with running water for at least 15 minutes and seek medical attention. Avoid prolonged exposure to skin. Harmful to synthetic fabrics, wood finishes and plastics. Product will melt styrofoam. NOTE: Acetone may cause sensitive skin to become dry.
DISCLAIMER: Do not pour into plastic or styrofoam container.
INGREDIENTS: Acetone, Denatonium Benzoate.

Onyx Acetone Safety Data Sheet

WARNING!

Emergency Overview

FLAMMABLE LIQUID AND VAPOR
Irritating to eyes
Vapors may be irritating to eyes, nose, throat, and lungs
May cause central nervous system depression

Appearance: Clear, Colorless, Water-thin **Physical State:** Water-thin liquid **Odor:** Acetone
l i q u i d

Potential Health Effects

Primary Routes of Exposure	Skin contact. Inhalation.
Acute Toxicity	
Eyes	Irritating to eyes.
Skin	May cause skin irritation and/or dermatitis.
Inhalation	May cause irritation of respiratory tract. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination.
Ingestion	Not an expected route of exposure. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. May cause additional affects as listed under "Inhalation". May cause adverse liver effects. May cause adverse kidney effects.
Chronic Effects	Prolonged skin contact may produce dermatitis.
Aggravated Medical Conditions	Central nervous system. Pre-existing eye disorders. Skin disorders. Respiratory disorders.

Product Mishandling Review

★☆☆☆☆ Verified Purchaser

Very dangerous

They left this item at the door and got hit because of the sun and weather! When I open the bag, I got a bad headache because the bag got air with a the chemicals that the item almost exploded inside the bag and all the liquid came off due to the pressure.... This is not aceptable and very dangerous for customers, I'm not sure if I will head up to the ER, I inhale all the air from the bag without knowing this was going to happen, the bottle is out of shape now and unable to stand and the acetone cake off the bag .

Julissa

Best Strategies to Improve Indoor Air Quality

There are three basic strategies to improve indoor air quality.

1. **Source Control**: eliminate individual sources of pollution or to reduce their emissions.

2. **Improved Ventilation**: increase the amount of outdoor air coming indoors.

3. **Air cleaners**: filtration can be an effective supplement to source control and ventilation.

Source: THHNW.org

Best Practices to Improve Indoor Air Quality

- Living rooms:
  - Clean ceiling fans, make sure pets are not on furniture, clean fireplaces, vacuum regularly w/ HEPA filter vacuum (but when asthmatics are not in the area)
- Restroom:
  - Make sure vents are cleaned, use ventilation system often, identify if there is excess moisture to prevent mold or pests
- Bedroom:
  - Launder sheets weekly in hot water to prevent dust mites, vacuum regularly, and clean fans

Follow these 8 principles:

1. Keep it dry
2. Keep it clean
3. Keep it safe
4. Keep it well-ventilated
5. Keep it pest-free
6. Keep it contaminant-free
7. Keep it maintained
8. Keep it thermally controlled

Image Source: Tribal Indoor Air Quality Training & Resource Directory

Best Practices to Improve Indoor Air Quality

- Reduce use of fragrant products
- Read and follow the manufacturer's instructions for product use
- Clean with soap and water, ensure surface is also dried
- Clear clutter, especially items attractive to pests (such as paper products)
- Monitor and check indoor and/or outdoor plants for pests, remove standing water
- Ensure humidity of space is kept within adequate range to mitigate moisture to limit pests and mold growth
- Monitor sinks and other water sources for leaks
- Clean pets and pet bedding often
- Check for leaking pipes

Best Practices to Improve Indoor Air Quality

- Use microfiber cloths for dusting
- Use smoke alarms and carbon monoxide alarms
- Change your air filters regularly
- Close windows when there is farming activity or poor outdoor air quality
- Wash bedding weekly in hot water for dust mite protection
- Do not leave compost scraps out
- Check weather stripping on doors and windows
- Use ventilation systems
- Reduce/eliminate tobacco smoke exposure
- Clean carpets regularly; check for mold or standing moisture

Indoor Air Quality Questions

What is **NOT** known to be a possible risk that increases the chance of an individual developing asthma:

a) Family history of asthma

b) Smoking

c) Occupational Exposures

d) Exercise

Indoor Air Quality Questions

Indoor relative humidity levels should be ideally maintained between what percentage range?

a) 0-15%

b) 15-30%

c) 30-50%

d) 75-90%

ITCA Environmental Quality Programs

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