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Home Health Asthma Visits

NAC Asthma Conference 2024

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Objectives



- Outline the purpose and benefit of home health nursing visits for asthma
- Delineate items to review in the home that can lead to poor asthma outcomes
- Review the literature to delineate any improvements that Home Visits may help with

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Disclosures



- I have no financial disclosures
- Myself and our communities will benefit with the improvements in the health of patients with asthma

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Background

- Children and teens spend up to 90% of their time indoors and at least 50% of that time in their home
- Home environment is an important focus for reducing exposures to triggers of asthma
 - Pet dander
 - Mold
 - Pests (dust mites, cockroaches)
 - Irritants (NO₂, candles, cleaning products)
 - Secondhand smoke
- Reducing triggers is linked to improved outcomes (hospitalizations & ER visits)

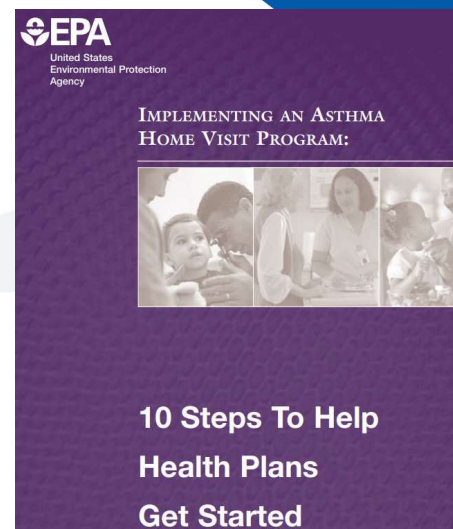
-Minnesota Dept of Health – Asthma Homes



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Home Visit Opportunities

- Walk-through can help identify triggers of asthma so steps can be taken to reduce or eliminate these
- Provide individualized asthma self and caregiver-management education
 - MDI + Spacer use and adherence tracking
 - Review of triggers and Asthma Action Plan
- Identify and refer to Community Resources
 - Quitline, Healthy Homes, Social Work, etc
- Guidance for establishing a Home Visit Program from US Environmental Protection Agency



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Determining “Who” to Offer Home Visits to



- Stratify and identify based on Asthma Severity
 - Severe Persistent?
- Not well controlled
 - 2 or more ER visits
 - 1 or more admissions
 - Frequent albuterol use (5:1 albuterol:ICS)
- Currently have automatic reporting and Asthma pathway that helps identify high risk patients
- Epic order in place to make easy referral to Children's Home Health

Home Health RN Visits

Class:

Referral Type:

Referral Priority:

Comments:

of Visits (per week):

Frequency of Visits:

For # of Weeks:

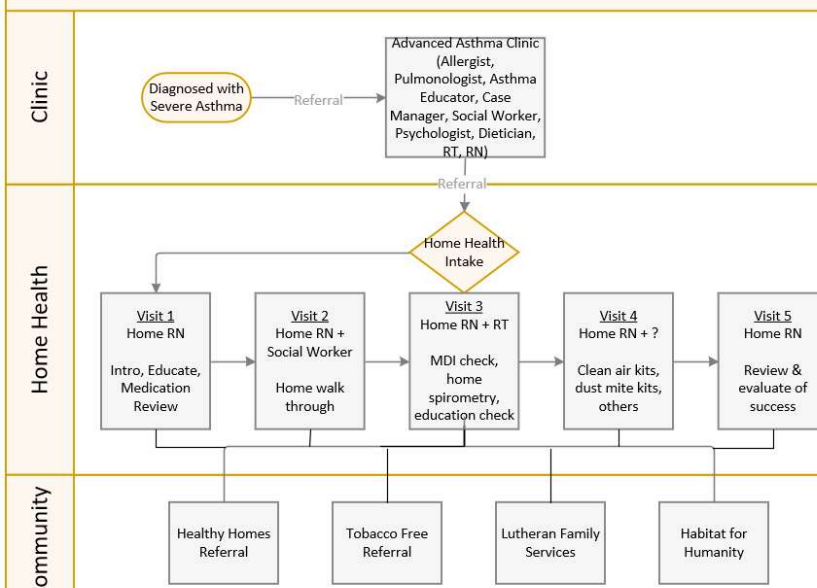
Visit Reason (Select all that apply): ☒

Provider to follow patient (the person listed here will be responsible for signing ongoing orders):

[Additional Order Details](#)

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Multi-Modal Care of Severe Asthma



Current Plan

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Training of Staff



- Annual Asthma Conference
- American Lung Association Affiliation
- Asthma Educator Courses
- Pediatric Environmental Health Specialty Unit
Specific "Healthy Homes training courses"
 - **Healthy Home Consumer and Family Workshops** – Brief, 1-4 hour workshops for community members and local organizations.
 - **The Healthy Housing Principles** – One-day introductory course on the 8 healthy housing principles for anyone who visits, works on or advocates for housing.



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Checklist

- Home Interior
 - Secondhand smoke
 - Pets
 - Consumer Products
 - Heating & Cooling Systems
- Room Interior
 - Bedding and Sleep Arrangements
 - Flooring
 - Upholstered Furniture and Stuffed Toys
 - Window Treatments
 - Cooking Appliances
 - Moisture Control
 - Pest Control
- Outdoor Air Pollution

Home Characteristics and Asthma Triggers

Checklist for Home Visitors

Using this Home Assessment Can Help Make Homes Healthier.

A trained home visitor can help find common asthma triggers in homes and discuss ways to reduce and remove triggers. Removing asthma triggers in the home, along with proper medical care can improve health.

The checklist is organized into a Core Assessment plus two appendices (Dust Mite Module and Mold and Moisture Module). The Core Assessment can be used for all types of housing and climates, but the additional modules can be used if dust mites or mold/moisture issues are suspected by the trained home visitor. The suggested action items in this checklist are generally simple and low cost.



Glossary of Asthma Triggers Commonly Found in Homes

Combustion by-products

Triggers: Particles and gases that are formed when fuel is burned.

Where Found: Gas cooking appliances, fireplaces, woodstoves, candles, incense, cigarettes, and unvented kerosene and gas space heaters.

Dust Mites

Triggers: Body parts and droppings.

Where Found: Mattresses, bedding, carpeting, curtains, upholstered furniture, and stuffed toys. Dust mites are too small to be seen with the naked eye. They can survive in a range of climates, but they prefer high humidity.

Mold

Triggers: Mold spores, fragments, and odors.

Where Found: Indoor mold growth is often found in areas with more moisture such as kitchens, bathrooms, and basements, or areas where water damage has occurred. There are many types of mold and they can be found in any climate.

Pests

Triggers: Cockroaches—Body parts and droppings. Rodents—Fur, skin flakes, and urine.

Where Found: Areas with food and water such as kitchens, bathrooms, and basements.

Pets with fur

Triggers: Fur, skin flakes, and saliva.

Where Found: Throughout entire home.

Secondhand Smoke

Triggers: Mix of smoke from the burning end of a cigarette, pipe, or cigar and the smoke exhaled by a smoker.

Where Found: Anywhere that smoking is allowed.

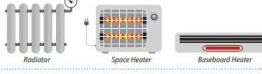
Volatile organic compounds (VOCs)

Triggers: Chemical vapors that come from household items.

Where Found: Products such as cleaning agents, deodorizers, air fresheners, perfumes, paints, nail polish, and nail polish remover.




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DUST MITE MODULE		Core Assessment (continued)	
<p>Answers in the red checkboxes (the first column) are associated with dust mites. The more the more likely you have high dust mite levels in your home. You can take actions shown at 11.</p> <p>Building</p> <p>Are all your windows sealed shut or don't open?</p> <p>Is any part of your living area below ground level?</p> <p>If YES, does this area ever get wet or stay wet for long periods (more than 1 week)?</p> <p>Heating, Ventilation, and Cooling</p> <p>During winter, are some outside walls cold?</p> <p>Does your air conditioner ever leak water onto walls or carpeting?</p> <p>Does your home sometimes smell "stuffy," "stale," or "musty"?</p> <p>Bedroom Characteristics of Person with Asthma</p> <p>Do you have upholstered furniture in the bedroom of the person with asthma?</p> <p>Do you allow children to have stuffed animals/toys in the room?</p> <p>Dust Reservoirs (overall home)</p> <p>Do you have cloth sofa or chair?</p> <p>Do you have cloth curtains?</p> <p>Can you see dust or dirt on your furniture, walls, ceiling, and curtains?</p> <p>Do you have wall-to-wall carpeting in more than half of the rooms in your home?</p> <p>Do you have wall-to-wall carpeting in your kitchen or bathrooms?</p> <p>Do you vacuum less than once a week?</p> <p>Dampness</p> <p>In the last 12 months, have you noticed condensation on windows in your home?</p> <p>If YES, does moisture regularly build-up on your windows/walls?</p> <p>In the last 12 months, have you had any water leaks?</p> <p>Do you use a dehumidifier regularly?</p> <p><small>*Regular use of dehumidifiers may suggest that a home is humid (dust mites prefer humid)</small></p>		<p>PESTS</p> <p>Checklist Questions</p> <p>If Yes, in the last 12 months, how often have you seen cockroaches inside your home?</p> <p><input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> A few times a year</p> <p>In the last 12 months, have you or an exterminator used any pest control measures (pesticides, traps, etc.) to control cockroaches in your home?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know</p> <p>In the last 12 months, have you or an exterminator used any pest control measures (pesticides, traps, etc.) to control other insects in your home?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know</p> <p>In the last 12 months, have you seen evidence of mice or rats inside your home?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know</p> <p>If Yes, in the last 12 months, how often have you seen evidence of mice or rats inside your home?</p> <p><input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> A few times a year</p> <p>In the last 12 months, have you or an exterminator used any pest control measures (pesticides, traps, etc.) to control mice or rats in your home?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know</p> <p>Potential Action Steps</p> <ul style="list-style-type: none"> Use integrated pest management Use IPM methods as described above Use snap traps in areas away from 	
		<p>CORE ASSESSMENT</p> <p>Building Information</p> <p>Checklist Questions</p> <p>Are your living quarters in a:</p> <p><input type="checkbox"/> One-unit building, detached from any other building?</p> <p><input type="checkbox"/> One-unit building, attached to one or more buildings?</p> <p><input type="checkbox"/> Building with two or more apartments?</p> <p><input type="checkbox"/> Manufactured/Mobile Home?</p> <p>Is your home:</p> <p><input type="checkbox"/> Owned?</p> <p><input type="checkbox"/> Rented?</p> <p><input type="checkbox"/> Occupied without payment of rent?</p> <p>How many stories are there in your home including attics and basements?</p> <p>No. of Stories: _____</p> <p>Home Interior</p> <p>HEATING and COOLING</p> <p>Checklist Questions</p> <p>During the winter, what is the primary way your home is heated?</p> <p><input type="checkbox"/> Radiators <input type="checkbox"/> Baseboard heater <input type="checkbox"/> Forced hot air (vents) <input type="checkbox"/> Space heater <input type="checkbox"/> Fireplace/wood-burning stove <input type="checkbox"/> Other _____ <input type="checkbox"/> N/A</p> <p>In addition to the main source of heat, do you use any other source(s)?</p> <p><input type="checkbox"/> Radiators <input type="checkbox"/> Baseboard heater <input type="checkbox"/> Forced hot air (vents) <input type="checkbox"/> Space heater <input type="checkbox"/> Fireplace/wood-burning stove <input type="checkbox"/> Other _____ <input type="checkbox"/> N/A</p> <p>Potential Action Steps</p> <ul style="list-style-type: none"> Properly ventilate the room where a fuel-burning appliance is used and consider using appliances that vent to the outside whenever possible. Never use a gas-cooking appliance as a heating source. If using a fireplace, make sure it is properly vented to help ensure smoke escapes through the chimney. If using a wood-burning stove, make sure that doors are tight-fitting. Use aged or cured wood only and follow the manufacturer's instructions for starting, stoking, and putting out the fire. If using an unvented kerosene or gas space heater, follow the manufacturer's instructions for proper fuel to use and keep the heater properly adjusted. <p></p>	

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Outcomes (KPI's)

- Reduced ER visits
- Reduced Asthma hospitalizations
- Lower bronchodilator use
- Fewer days of missed school/work
- Written Asthma Action Plans
- Reduction of home triggers
- Better knowledge based on pre-post questionnaire



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Does This Help?



- Lowell Healthy Homes Program in Massachusetts low-income invested \$36,240 but saved over \$71,162 over a 4 week assessment period (>\$820k est annual savings)

- 4-9 home visits over 1 year period, identifying and removing asthma triggers
- Provided high efficiency filter vacuums, green cleaning chemicals
- Educated on mitigation of triggers and safety hazards

Change in Asthma Severity Indicators: Healthy Homes Program; Lowell, MA; September 2009–January 2012

Variable	Baseline (n = 170), ^a No. (%) or Mean	Follow-Up (n = 170), ^a No. (%) or Mean	Change ^b (95% CI)
Past 4 wk			
Episodes of wheezing	6.40	2.30	4.1 (2.7, 5.6)
Asthma attacks	0.80	0.20	0.6 (0.2, 1.0)
Emergency department visits	0.20	0.04	0.2 (0.1, 0.2)
Doctor visits	0.70	0.20	0.4 (0.2, 0.6)
Hospitalization	0.05	0.00	0.1 (0.01, 0.8)

- Turcotte (et al) Healthy homes: in-home environmental asthma intervention in a diverse urban community. Am J Public Health. 2014 Apr;104(4):665-71

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Home-Based Education Evidence



- Community Health Workers in low-income community in Texas-Mexico border area visited 290 homes of predominantly Hispanic children with asthma
- Educated on principles of Asthma and Healthy Homes curriculum and contents of the Seven Principles of Healthy Homes to 130 intervention group via lectures, discussions, exercises, case studies, and Q&A sessions. 160 control group participants received educational pamphlets on asthma management
- All participants received allergen-proof mattress/pillow encasing, and non-chemical cleaner recipes and instructions

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From: *Effects of the home-based educational intervention on health outcomes among primarily Hispanic children with asthma: a quasi-experimental study*

	Intervention group (Mean \pm SD)				Control group (Mean \pm SD)				p-value of change ^c
	Baseline	Follow-up	p-value ^a	Change ^b (95% CI)	Baseline	Follow-up	p-value ^a	Change ^b (95% CI)	
Number of asthma attacks	0.77 \pm 2.43	0.27 \pm 0.91	0.029	-0.5 (-0.86, -0.14)	0.24 \pm 0.63	0.12 \pm 0.54	0.07	-0.12 (-0.24, 0)	0.049
Hospitalizations	0.03 \pm 0.28	0 \pm 0	0.207	-0.03 (0.08, 0.02)	0.006 \pm 0.08	0.006 \pm 0.08	1	0 (-0.02, 0.02)	0.235
Emergency room visits	0.05 \pm 0.24	0.03 \pm 0.17	0.559	-0.02 (-0.06, 0.03)	0.05 \pm 0.25	0.06 \pm 0.44	0.756	0.13 (-0.06, 0.09)	0.530
PH score	72.69 \pm 20.38	89.53 \pm 11.76	< 0.001	16.76 (13.79, 19.73)	76.15 \pm 19.08	90.74 \pm 12.09	< 0.001	14.86 (12.17, 17.55)	0.351
AC score	85.26 \pm 23.31	92.65 \pm 15.01	0.003	7.39 (3.58, 11.21)	88.75 \pm 20.84	93.87 \pm 13.2	0.009	5.13 (1.95, 8.30)	0.366
AF score	85.78 \pm 18.33	91.34 \pm 17.32	0.013	5.5 (2.67, 8.34)	88.41 \pm 16.06	91.60 \pm 14.38	0.06	3.28 (1.17, 5.39)	0.215
EC score	69.23 \pm 33.56	80.92 \pm 26.37	0.002	11.69 (6.86, 16.52)	68.5 \pm 35.06	80.31 \pm 28.3	0.001	11.70 (6.92, 16.48)	0.999
EF score	62.34 \pm 17	70.98 \pm 13.06	< 0.001	8.63 (5.77, 11.51)	60.73 \pm 18.27	66.31 \pm 14.08	0.002	5.57 (3.28, 7.87)	0.1

^a Using two sample t test for baseline and follow-up data; ^b Using one sample t-tests for changes (follow-up – baseline) in each group; ^c Using two sample t test to compare the change results (follow-up – baseline) between intervention and control groups

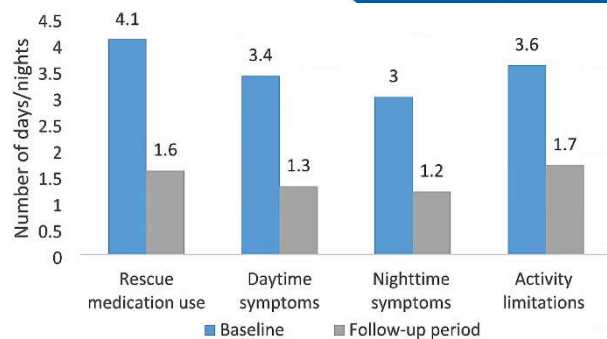
PH physical health of children, AC activities of children, AF activities of family, EC emotional health of children, EF emotional health of families

- Baek *et al.* Effects of the home-based educational intervention on health outcomes among primarily Hispanic children with asthma: a quasi-experimental study. *BMC Public Health* **19**, 912 (2019).

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Inner City Evidence

- 123 childhood asthmatics referred from ED of South Side Chicago to community health worker home intervention program (89% black)
- Provided health education, conduct home environmental assessments to identify asthma triggers and provide remediation supplies, communicate with healthcare team members, and connect people to resources to address social determinants of health
- Modeled after the Community Asthma Initiative from Boston
- Average 3.9 visits each (35% dropout after 1st visit)



Symptom days/nights, rescue medication usage, and activity limitations in the past 2 weeks reported at baseline versus median reported across all follow-up visits (all $p < 0.001$ from paired t-test) ($n = 119$)

- Basnet *et al.* Collaborative Integration of Community Health Workers in Hospitals and Health Centers to Reduce Pediatric Asthma Disparities: A Quality Improvement Program Evaluation. *J Community Health* **49**, 682–692 (2024).

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Thank you!

Copies of slides available upon request

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References

- Minnesota Dept of Health, *Asthma and the Home Environment*, webpage
<https://www.health.state.mn.us/diseases/asthma/homes/index.html>
- CDC and EPA, website on *Healthy Homes*
- Turcotte DA, Alker H, Chaves E, Gore R, Woskie S. Healthy homes: in-home environmental asthma intervention in a diverse urban community. *Am J Public Health*. 2014 Apr;104(4):665-71.
- Baek, J., Huang, K., Conner, L. *et al*. Effects of the home-based educational intervention on health outcomes among primarily Hispanic children with asthma: a quasi-experimental study. *BMC Public Health* **19**, 912 (2019).
- Basnet, S., Wroblewski, K., Hansen, E. *et al*. Collaborative Integration of Community Health Workers in Hospitals and Health Centers to Reduce Pediatric Asthma Disparities: A Quality Improvement Program Evaluation. *J Community Health* **49**, 682–692 (2024)

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