



Guidelines for Incorporating Energy and Water Conservation in Home Health and Preservation Programs

August 2019

Executive Summary

Philadelphia faces high rates of childhood asthma, which is complicated and aggravated by poor housing conditions that can trigger chronic flare-ups. Healthcare institutions are creating programs that include home improvements for patients with repeat readmissions and other serious cases.

The Philadelphia Energy Authority is supporting these programs so that they consider ways that home interventions can reduce – or at least not worsen – energy insecurity for participants. New and existing programs designed to improve participants' health by remedying poor home conditions can maximize their impact by following these guidelines.

1. Adopt energy standards for improvements made to the home, as described in Section I.
2. Treat the home as a system and perform a comprehensive home assessment to identify home health, safety, and energy needs, as described in Section II.
3. Refer participants to other programs to help them address home health, safety, and energy needs. A list of resources is available in Section III.

Introduction

The asthma rates for children in Philadelphia have risen to epidemic rates, with minority and low-income populations being the hardest hit.¹ Healthcare institutions understand that treating patients suffering from acute symptoms and advising them on management strategies is not always sufficient to improve patient outcomes. These institutions recognize that there is a link between specific triggers in patient homes and asthma symptoms.² Healthcare institutions are now looking at ways they can have a direct impact on patient care by finding and removing triggers in patient homes.

Programs delivering asthma-related interventions in patient homes often have a secondary benefit of addressing home preservation needs that may not be immediately affordable to the owners. This connection between health and home preservation is resulting in the formation of new partnerships, such as the Community Asthma Prevention Program Plus (CAPP+), a

¹ Average childhood asthma rates declined to roughly 60 per 10,000 children but the rates among hispanic and black children are 15% and 27% higher, respectively. Health of the City 2018
<https://www.phila.gov/media/20181220135006/Health-of-the-City-2018.pdf>

² National Institute of Health. Guidelines for the Diagnosis and Management of Asthma (EPR-3). 2007
<https://www.nhlbi.nih.gov/health-topics/guidelines-for-diagnosis-management-of-asthma>

collaboration between the Children’s Hospital of Philadelphia and the Philadelphia Housing Development Corporation.

When programs address home health, the subsequent home preservation impacts also presents opportunities to impact the long-term sustainability of these homes. First, programs should set minimum energy use standards for new systems installed to manage asthma (e.g. air-conditioning and dehumidification). Programs serving low-income households need to account for the additional utility costs that come with new dehumidification, air conditioning, and air cleaning equipment. Using high efficiency equipment lowers operating costs and helps ensure that this critical equipment does not get unplugged to help manage costs.

Secondly, there is an opportunity to perform a more comprehensive home assessment to uncover other health and energy improvement opportunities in the home. Such programs may have to leverage other local resources to address the additional needs, but can also offer important tangible benefits. Energy insecurity is a serious challenge for Philadelphia homeowners who commonly have to choose between keeping their homes heated and cooled and paying for essentials like medicine. Studies have linked energy insecurity to negative childhood health outcomes, including increased cases of asthma, and utility shut-offs take these impacts to a further extreme, especially for individuals with chronic illness relying on powered equipment.^{3 4}

This document is divided into two parts. The first provides energy recommendations for common asthma remediation strategies. PEA recommends that these strategies be adopted in full for all low-income asthma prevention programs. The second part lays out recommendations for conducting comprehensive home assessments and recommended energy standards for other common materials and equipment. The second part serves to inform program managers of additional opportunities for health, safety, and energy improvements.

PEA can provide further guidance on implementing these recommendations. Please contact Alon Abramson, Program Manager at aabramson@philaenergy.org or 215-686-4483.

I. Reducing Energy Use of Asthma Trigger Remediation Strategies

The Philadelphia Energy Authority has identified opportunities to lower the energy burden of asthma trigger remediation strategies. These findings and recommendations are summarized in Table 1.

³ Social Science and Medicine. Understanding ‘energy insecurity’ and why it matters to health. 2016. <https://www.sciencedirect.com/science/article/pii/S0277953616304658>

⁴ The Utility Reform Network. Living Without Power: HEALTH IMPACTS OF UTILITY SHUTOFFS IN CALIFORNIA. 2018. http://www.turn.org/wp-content/uploads/2018/05/2018_TURN_Shut-Off-Report_FINAL.pdf

Table 1: Asthma trigger remediation strategies and associated energy recommendations

Trigger	Opportunities for Action	Energy Recommendation(s)
<ul style="list-style-type: none"> • Dampness / Moisture 	Fix leaks from the exterior (roof, windows, doors, foundation)	<ol style="list-style-type: none"> 1. Insulate roof cavity whenever possible 2. If replacing exterior windows, use R-5 windows with thermally broken frames. 3. If replacing exterior doors, select doors rated for exterior use. 3. Weatherstrip around exterior doors and windows.
	Damp living area: keep between 40-50% humidity using a dehumidifier	ENERGY STAR labeled dehumidifier
	Damp basement: keep between 40-50% humidity using a dehumidifier	ENERGY STAR labeled dehumidifier
<ul style="list-style-type: none"> • Dampness / Moisture • Mold and fungus • House dust mites 	Install an air conditioner in the child's sleep area	ENERGY STAR labeled air conditioner
<ul style="list-style-type: none"> • Mold and fungus 	Fix leaks and use a dehumidifier to keep area between 40-50% humidity.	ENERGY STAR labeled dehumidifier
	Bathroom mold: Open window or run bath fan during & after bathing. Clean tub & shower routinely.	If installing new bathroom fan, use ENERGY STAR labeled extractor fan
<ul style="list-style-type: none"> • Mold and fungus • Fragrances, VOC's and chemicals • House dust mite • Cats, Dogs, Domestic Birds, and Rodents 	MERV-12 or higher ⁵ furnace filters Eliminate source(s) of the triggers	<ol style="list-style-type: none"> 1. minimum 2" filter thickness (4" where possible), if filter box allows⁶ 2. if 2" filter thickness is not possible, consider MERV-6 to MERV-8 filters and a localized air cleaner
<ul style="list-style-type: none"> • House dust mite 	Remove source of mites. Room air cleaner	ENERGY STAR labeled room air cleaner
<ul style="list-style-type: none"> • Nitrogen Dioxide 	Run stove exhaust fan during cooking.	If installing new kitchen fan, use ENERGY STAR labeled extractor fan

II. Comprehensive Home Assessment

PEA recommends that healthcare institutions who are doing work to remove home triggers consider doing a holistic home inspection. The first inspection should integrate a health and energy assessment and be conducted by a BPI certified home inspector.

⁵ National Institute of Health. Reducing patients' exposures to asthma and allergy triggers in their homes: an evaluation of effectiveness of grades of forced air ventilation filters. 2014.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4133967/>

⁶ Home Performance Magazine. Is There a Downside to High-MERV Filters? 2009.
<http://www.homeenergy.org/show/article/nav/issues/page/4/id/667>

Table 2 provides a summary of details that could be evaluated during a full home assessment and recommendations to improve health and energy performance.

Table 2: Sample home assessment evaluation guide

Feature	Health and Energy Mitigation Recommendations
Wall assembly: structure, insulation levels, drafts	Install insulation and seal air gaps.
Attic: accessibility, condition, and insulation level	Install insulation, along with any necessary mitigation actions (e.g. knob and tube wiring, asbestos removal, venting).
Windows: type and condition	Windows to be repaired and/or replaced. Efficiency upgrades such as weather-stripping and addition of storm windows for existing windows.
Roof: type and condition	Replacement or repair. Apply solar reflective coating to flat and low-slope roofs.
HVAC equipment: product details, condition	Replacement of low-efficiency and non-functioning equipment with high-efficiency models.
Ductwork and combustion equipment exhaust systems: type and condition	Duct sealing, flue and chimney liner repair or replacement.
Thermostat: type, set points	Replacement with programmable thermostat. Programming with efficient set points.
Refrigerators: type, condition	Replacement of low efficiency equipment with high efficiency models. Relocation of equipment located in unconditioned spaces.
Ventilation equipment: location, type, and condition	Install equipment where none is installed (i.e. bathrooms, kitchen). Replace nonfunctioning equipment or fans that do not exhaust to the exterior.
Mold, standing water, excessive moisture: location, details	Remove and repair mold contamination. Mitigation actions to eliminate sources of moisture.
Other asthma triggers, such as wall-to-wall carpet	Remove wall-to-wall carpet and other asthma triggers, replace carpet with durable flooring.
Evidence of pests/vector	Integrated pest management. ⁷
Smoke and CO alarms: location and condition	Install equipment where absent. Replace nonfunctioning equipment.
Lead paint	Owners of properties built before 1978 and rented to children six years or younger must provide the tenant with certification prepared by a certified lead inspector stating that the property is either lead free or lead safe. ⁸
Asbestos	If the asbestos cannot safely be kept in place, work with a certified asthma abatement professional. ⁹
Evidence of oil tank leak	Remove existing oil tank and contaminated soil. Replace oil heating system with high efficiency gas or electric system.

⁷ Apprehend Integrated Pest Management. <https://www.aprehend.com/>

⁸ Resources available from the Philadelphia Department of Public Health. <https://www.phila.gov/documents/lead-and-healthy-homes-resources-for-landlords/>

⁹ Resources available from the Philadelphia Department of Public Health. <https://www.phila.gov/services/permits-violations-licenses/apply-for-a-permit/environmental-permits-and-approvals/dust-air-pollution-and-asbestos/apply-for-an-asbestos-project-permit/>

Programs seeking to provide home interventions beyond asthma interventions should set minimum energy and water use standards for equipment and materials. PEA’s recommendations are shown in Table 3.

Along with these recommendations, all air sealing and insulation should be performed to ENERGY STAR and/or BPI guidelines. If a roof requires substantial repair and replacement, the attic cavity should be air-sealed and insulated.

Table 3: PEA Recommended program efficiency standards

Equipment	Specification
Appliances	
Clothes Washer	ENERGY STAR certified
Clothes Dryer	ENERGY STAR certified
Dehumidifier	ENERGY STAR certified
Dishwasher	ENERGY STAR certified
Refrigerator	ENERGY STAR certified
Room Air Conditioner	ENERGY STAR certified
HVAC	
Air-Source Heat Pump	Product must meet ONE of the criteria sets below: a. Split: SEER ≥ 15.0, EER ≥ 12.5, and HSPF ≥ 8.5. b. Package: SEER ≥ 15.0, EER ≥ 12.0, and HSPF ≥ 8.2.
Boiler - Gas	AFUE ≥ 90%.
Boiler - Oil	AFUE ≥ 87%.
Boiler - Steam	AFUE ≥ 82%.
Central Air Conditioner	Product must meet ONE of the criteria sets below: a. Split: SEER ≥ 15.0 and EER ≥ 12.5. b. Package: SEER ≥ 15.0 and EER ≥ 12.0.
Ductless Mini-Split Air Conditioner	SEER ≥ 15.0 and EER ≥ 12.5.
Ductless Mini-Split Heat Pump	≥ 15.0, EER ≥ 12.5, and HSPF ≥ 8.5.
Furnace - Gas	AFUE ≥ 95%
Furnace - Oil	AFUE ≥ 85%.
Thermostat	Programmable
Duct Insulation	R-8
Duct Mastic and Tape	UL-181
Air filters	MERV ≥ 8
Water Heating	

Equipment	Specification
Tank Water Heater - Electric Heat Pump	ENERGY STAR Certified
Tank Water Heater - Gas Storage	ENERGY STAR Certified
Building Materials	
Ceiling Insulation	R-value ≥ 38 or maximum R-value that can be achieved with structural limitations
Lighting	LED, ENERGY STAR Certified
Cool Roof Coating	Solar reflectance ≥ 0.5
Windows	R-5 of greater. Thermally broken frames
Water Conservation	
Kitchen and Bath Aerators	WaterSense Certified
Low Flow Shower Heads	WaterSense Certified

III. Resources

Utility Bill Reduction

Program Name: Water Bill Customer Assistance

Managing Organization: Philadelphia Water Department

Program Description: Water bill payment assistance from City of Philadelphia.

Website: <https://www.phila.gov/services/water-gas-utilities/pay-or-dispute-a-water-bill/water-bill-customer-assistance/>

Program Name: Gas Customer Responsibility Program

Managing Organization: Philadelphia Gas Works

Program Description: PGW's LIURP encompassing program that provides customers discounts on their monthly gas bill as well as past due balance relief.

Website: <https://www.pgworks.com/residential/customer-care/crp>

Program Name: Electric Customer Assistance Program (CAP)

Managing Organization: PECO

Program Description: Provides monthly credit on customer's electric bill to assist with payment.

Website: <https://www.peco.com/MyAccount/CustomerSupport/Pages/CAPRate.aspx>

Program Name: Weatherization Assistance Program

Managing Organization: Philadelphia Housing Development Corporation

Program Description: Provides free weatherization/energy efficiency improvements to income-eligible households.

Website: <https://phdchousing.org/home-repair/weatherization-assistance-program/>

Program Name: Low Income Usage Reduction Program (LIURP)

Managing Organization: PECO

Program Description: Energy savings improvements to qualifying households to help reduce utility bills and electricity usage.

Website: <https://www.peco.com/MyAccount/CustomerSupport/Pages/LIURP.aspx>

Program Name: Low Income Home Energy Assistance Program (LIHEAP)

Managing Organization: PA Department of Human Services

Program Description: Provides cash grants to customers unable to pay their utility bills.

Website: <http://www.dhs.pa.gov/citizens/heatingassistanceliheap/index.htm>

Program Name: Water Conservation Housing Stabilization Program

Managing Organization: UESF

Program Description: Helps water customers prevents low-income families with high water usage and high bills from getting behind on their bills and facing having their water turned off.

Website: <https://uesfacts.org/our-programs/utility-housing-stabilization/>

Program Name: Utility Grant Program

Managing Organization: UESF

Program Description: Financial assistance to low income individuals and families who are facing utility terminations or who have had their utilities shut off.

Website: <https://uesfacts.org/our-programs/utility-grant-program/>

Program Name: Oil Assistance Program

Managing Organization: UESF

Program Description: Direct oil assistance for low-income residents unable to afford cost of oil delivery.

Website: <https://uesfacts.org/our-programs/oil-assistance-program/>

Home Health and Safety

Program Name: Adaptive Modifications Program

Managing Organization: Philadelphia Housing Development Corporation

Program Description: Provides free adaptations to households of individuals with permanent physical disabilities.

Website: <https://phdchousing.org/home-repair/adaptive-modifications-program/>

Program Name: Lead and Healthy Homes Program

Managing Organization: Philadelphia Department of Public Health

Program Description: Provides lead prevention and remediation services to low-income families and families with children who have high blood lead levels

Website: <https://www.phila.gov/programs/lead-and-healthy-homes-program/>

Home Repair

Program Name: Basic System Repair Program

Managing Organization: Philadelphia Housing Development Corporation

Program Description: Philadelphia Housing Development Corporation pays up to \$18,000 to address emergency home repairs for eligible households.

Website: <https://phdchousing.org/home-repair/basic-systems-repair-program/>

Program Name: Senior Housing Assistance Repair Program (SHARP)

Managing Organization: Philadelphia Corporation for Aging (PCA)

Program Description: Minor home repair program for Philadelphia homeowners 60 years and older.

Website: http://www.pcacares.org/service_provider/pca-sharp-program/