

Providing Health Services as Part of Residential Energy-Saving Programs

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This guidance document is part of a series of materials developed by ACEEE in 2021 for a network of program administrators exploring opportunities to incorporate health into energy efficiency programs. For more information, contact Christine Gerbode (Health and Environment program; cgerbode@aceee.org.)

This document is designed to help administrators of residential energy-saving programs consider the following questions:

- Why should we offer health services as part of our program?
- What health services might our program offer?
- How should we decide which health services to offer?

It concludes with prompts that program administrators can use to help navigate the decision-making process and examples of programs that have added these services.

Most energy-saving programs are already offering some services that improve health. For example, improvements to ventilation or sealing the building envelope may be required as part of safe and effective weatherization but can also reduce asthma triggers in the home, such as drafts, mold, and other allergens. Complementing these energy savings services with additional targeted asthma services and education could provide more holistic asthma mitigation to a household. Asthma is just one example; there are many opportunities to positively impact participant health with energy-saving programs. Many energy-saving services provide health benefits to building occupants, and existing programs can be used to deliver additional health-related services. Figure 1 below illustrates these relationships for mitigation and prevention of asthma, thermal injuries (heat and cold stress), and injuries from falls.

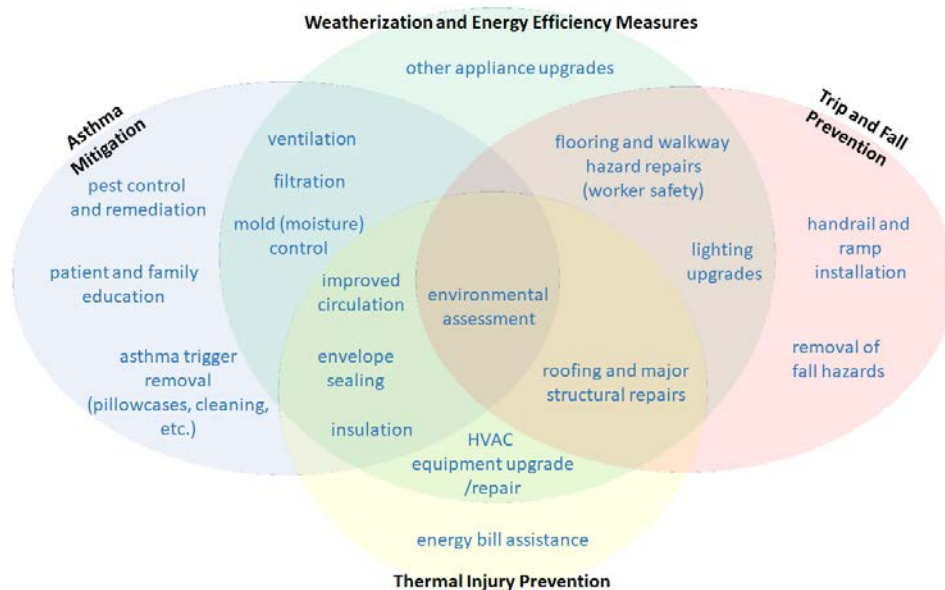


Figure 1. Examples of overlaps between residential energy efficiency services and services that might be included to improve home health and safety

WHY SHOULD MY HOME ENERGY PROGRAM OFFER HEALTH SERVICES?

Offering these complementary health services can be a win–win for program administrators.

- **Increase program funding.** The nationwide network of energy efficiency and weatherization programs offers a channel for delivering preventive health services outside of hospitals and clinics. By incorporating preventive health measures or collaborating with existing home health programs, these programs are better positioned to acquire new sources of funding aimed at improving public health, such as grants and Medicaid dollars.
- **Reduce the number of homes that are turned away from the program (i.e., deferred).** Pre-existing health and safety issues such as mold, leaky roofs, and asbestos frequently lead to deferrals of program services, because work cannot be completed safely or effectively. By addressing health and safety needs as part of program design, programs can reduce deferrals.
- **Achieve more equitable outcomes.** Many of the health harms that programs can mitigate disproportionately affect households of color.¹ Black Americans are approximately 1.5 times more likely to have asthma than white Americans and 5 times more likely to go to the emergency department due to asthma.² At the same time, Black families are 60% more likely than white families to live in inadequate housing conditions³ and face disproportionate exposure to pollution and toxins, safety hazards, high energy burdens, and economic instability.⁴ By improving living conditions in historically underinvested and overburdened communities, we can begin to mitigate the inequitable underlying causes of death and disease.
- **Expand program reach.** People want safe and healthy homes and may be motivated to participate in programs that offer improvements to health, comfort, or safety.⁵ Providing such services and marketing their benefits can generate interest and buy-in from new participants.
- **Better serve the public.** Maximizing the benefits that accrue to customers and reducing the risk of harms is a public good. Offering services that improve health can help programs to better serve the public. Though negative outcomes are rare, there are always potential risks when altering the environment of a person’s home. Program administrators who consider health as part of program design can help avoid unintended consequences and maximize benefits for program participants.

WHAT HEALTH SERVICES MIGHT OUR PROGRAM OFFER?

Many programs already provide some health and safety measures. Approximately 15% of funding for the federal Weatherization Assistance Program (WAP) is spent on health and safety work such as electrical repair, combustion appliance safety testing, assessment of fire hazards, ventilation, lead and asbestos control, client education, smoke detector installation, and more.⁶ Utility-run programs are also investing in these types of services. The New Jersey Comfort Partners program and Puget Sound Energy program can spend nearly a third of their per-home budgets on health and safety measures such as ventilation improvements and roof leak repairs.⁷

Examples of health-focused in-home services already being delivered by programs include the following:

Type	Examples of specific services
Protection from outdoor environment/elements	Moisture sealing Weather stripping Pest exclusion and removal services
Building and electrical code compliance	Plumbing repairs Electrical rewiring Structural repairs Roofing repairs
Ventilation and filtration of indoor air and pollutants	HVAC system upgrades, repair, and maintenance Filter replacement Allergen removal (e.g., pillowcases, cleaning, furnace filters, carpet removal)
Toxic hazard remediation	Lead remediation Asbestos remediation Mold remediation Radon mitigation
Technology and safety feature installation	Carbon monoxide detector installation Radon testing Smoke alarm installation, fire extinguisher provision Temperature and humidity measurement installation Fall prevention measure installation (lighting upgrades, handrail installation, flooring repair, shower grab bars)
Other technology maintenance, repair, and replacement	Appliance upgrade and replacement Refrigerator coil cleaning Furnace/water heater tune-up or replacement Water heater tune-up or replacement
Education	Assessment of health and safety exposures Community health worker support Disease management education

Some programs also bundle additional services to mitigate specific health harms. Examples of specific health harms that can be mitigated through in-home interventions include asthma, other respiratory-related illness (e.g., COPD, bronchitis), trip-and-fall injury, thermal injury (e.g., heatstroke, hypothermia), mold- and moisture-related illnesses, pest- and allergen-related illnesses, lead and asbestos exposure, mental health/comfort, poor sleep quality, and climate change-related threats. Some services that are commonly bundled include these examples:

Asthma Mitigation. Patient education around reducing asthma triggers in the home can include strategies for pest management, mold remediation, and trigger-reducing cleaning methods. In-home programs may also provide supplies such as low-VOC cleaning products, mattress encasements, and other products in

line with a trigger-reduction strategy. Programs may help patients and caretakers make plans for what to do when asthma is triggered, to reduce harm and improve outcomes. Examples of asthma mitigation measures an energy program might provide are listed below.

Trip-and-Fall Mitigation. Measures to mitigate trip-and-fall risks include improved lighting, installation of grab bars and railings, and surface or structural modifications to flooring and stairs, such as ramps and removal of slip or trip hazards. In-home education on safe movement and exercises to protect mobility may also be included.

Thermal Injury (Heat and Cold Stress) Mitigation. Proper temperature regulation and relatively uninterrupted access to heating and cooling are key to preventing thermal injury in the home. Education and new technologies, such as smart thermostats and efficient air-conditioning or heating equipment, can also prevent thermal injuries.

Consider a diverse range of health- and safety-related services

The New York Healthy Homes Value-Based Payment Pilot (see writeup in Program Examples section, pg. 8) is designed to offer a variety of energy-saving measures, such as insulation, air sealing, LED light bulbs, low-flow showerheads, refrigerator replacement, and upgrades and repairs to HVAC and ventilation systems. In addition, services this program is eligible to provide to address health threats include the following:

Injury Prevention

- Anti-scalding devices for sinks
- Shower seat with footgrips and backrests
- Threshold lowering/repair
- Nightlights with motion sensors
- Toilet and tub safety grab-bar installation
- Toilet safety frame/rail
- Tip-resistant furniture anchors
- Handrail—interior or exterior—repair/installation
- Grip strips for stairs or bathtubs
- Walkway repair
- Exterior motion sensor double-bulb lights
- Handheld shower head installation
- Repair of damaged floors or carpets that present a trip-or-fall hazard on floors or stairs
- Porch repair
- Cabinet locks
- Electrical outlet plugs
- Child safety gates
- Bump guards for tables
- Electric hazards
- Stair gripper treads, non-slip
- Threshold lowering/repair
- Walkway repair

Asthma Trigger Reduction

- Integrated pest management
- Whole house fan/ventilation system
- Kitchen exhaust fan—repair or install
- Bathroom exhaust fan—repair or install
- Dryer venting
- Carpet removal or removal of moldy/wet flooring and installation of replacement flooring
- Replacement of forced-air furnace filters and provision of additional filters
- Mold remediation
- Duct cleaning and sealing
- Window air conditioner and installation
- Humidifier or dehumidifier (with built-in pump) and installation
- Dirt floor vapor barrier
- Roof repair
- Gutter/downspouts system replacement
- Cleaning of gutters
- Plumbing repair—water line repair
- Plumbing repair—faucet install
- Basement waterproofing—coatings, drainage, sump pump
- Repairs to condensate drain
- Repairs to steam system
- Carpet steam cleaning

Other Health and Safety

- Tune up or install range stove
- Window replacement
- Smoke alarms with 10-year lithium battery
- Carbon monoxide alarms with 10-year lithium battery
- Gas leak detection

HOW SHOULD WE DECIDE WHICH HEALTH SERVICES TO OFFER?

There are many factors that might influence the choice of which services to offer. Administrators should start by identifying their goals: why is health being incorporated into the program? Next they should identify the steps needed to achieve those goals.

1. Identify Program Goals

Identifying the program goals will help administrators prioritize opportunities. Some of the goals that program administrators commonly identify include procuring new sources of funding, increasing participation, and reducing deferrals. The list of potential benefits earlier in this document could be adapted as a set of goals.

2. Assess Opportunities and Limitations

Once goals are identified, an assessment of the opportunities and limitations that surround achievement of these goals is a logical next step. Below we provide some examples of how that might proceed.

If the program goal is to reduce deferral rates, this assessment might include questions such as

- What are the common causes for deferrals in the community we serve?
- Does our current funding allow us to provide services to address the common causes of deferrals? If not, how might these services be funded?
- Do our current service providers have the expertise to address the most common preexisting health and safety threats that we encounter?

If the goal is to attract local health-sector support or future funding, questions to consider might include

- What are the biggest health threats to the community we serve?
- What health-focused actors are trying to address these threats?
- What in-home measures can help to mitigate these health threats?

If a program seeks to increase energy efficiency participation by incorporating desirable health services, questions to ask might include

- What are the issues of greatest concern to households in our service area?
- What community organizations or leaders might be able to help us understand what services would be most highly valued by the community?

At this assessment stage, additional research and outreach to identify community needs and resources can help identify potential partners, organizations already providing services, households or communities most in need of services, and potential sources of funding.

The chart below is meant to help program administrators consider local needs, resources, opportunities, and barriers that may influence the suitability and feasibility of incorporating health services into energy efficiency program work.

Needs inventory	
Community	Program
Are there specific health or safety challenges you frequently observe in households you serve? Are these challenges that could be addressed through work or education in the home?	
Are there high deferral rates in your service area? What tends to be the cause, if so? What role do housing conditions play in deferrals?	
What barriers do community members in your service area face to participating in an energy program like yours? Does your program actively address these barriers?	What barriers does your program face to providing health and safety services?
Resources inventory	
Community	Program
Are programs already operating in your service area that provide health-related services in homes? If so, could coordination benefit both your program and your participating households?	Does your program staff have the skills needed to provide health and safety services? If not, is training available to develop these skillsets?
Are there community organizations or institutions (hospitals, local researchers, public health agencies, local health insurance, or Medicaid offices) that can help identify health needs or barriers to participation in your service area, as well as existing programs or resources to address these challenges? Could these groups help you develop locally relevant solutions?	
Are grants or funding sources available to support health and community development programs that address specific types of health harms, or to support coordination initiatives between existing programs to address health holistically? Have you looked at local, state, federal, and private/philanthropic sources?	

Ideally, alignments between needs and resources within your program and service community will emerge from the answers to the questions posed above. For example, existing resources within your service area—whether programs, institutions, community organizations, or health actors—might be able to help address the health needs or deferral causes you have observed. Reaching out to discuss your ideas and goals with these organizations may be a good first step toward building partnerships.

PROGRAM EXAMPLES

New York State Healthy Homes Value-Based Payment Pilot

Administrators: New York State Energy Research and Development Authority (NYSERDA), New York State Department of Health (NYSDOH)

Current status: Pilot, pre-evaluation

The New York State Healthy Homes Value-Based Payment Pilot focuses on Medicaid member homes that include at least one child with poorly controlled asthma, in several high asthma-burden regions of New York State. The Pilot is designed to develop a framework that allows New York's managed care organizations to fund residential healthy homes interventions as part of their value-based payment (VBP) arrangements with healthcare providers within the Medicaid Healthcare Delivery System. The healthy homes intervention comprises the following dwelling-based services: energy efficiency/weatherization measures, environmental trigger reduction measures, and home injury prevention measures. In tandem with these services, the intervention includes in-home visits from a Registered Nurse and the assignment of a Community Health Worker to support each Pilot household throughout the Pilot duration.⁸ This program is underpinned by policy and funding support from New York State's Health in All Policies (HiAP) approach under state Executive Order 190, NYSERDA's Clean Energy Fund, NYSDOH's Prevention Agenda, and specific payment mechanisms negotiated within the framework of the state's Medicaid administration. See page 4 for a comprehensive list of planned energy and health-related service offerings.

Links to more information: 2019 New York State press release ([here](#)); July 23, 2020 DOE Better Buildings Residential Network call presentation (slides [here](#))

Contacts: [Mishel Filisha](#) (NYSERDA)

Vermont One Touch® Program

Administrators: Vermont Office of Economic Opportunity (Weatherization Program), others

Current status: Active

Vermont's One Touch Program aims to serve households qualifying for Vermont state housing or energy assistance programs (income-based guidelines) throughout the state. The program is enabled in part by implementation of the One Touch cross-sector electronic referral system. Weatherization and other partner programs use a common assessment to identify client energy, health, and housing needs and offer referrals to: lead abatement; fall prevention measures and other elder services; weatherization (sealing, insulation, heating system repairs); carbon monoxide and combustion safety testing; housing rehab; ventilation upgrades; radon testing; education and support on lead poisoning prevention, tobacco use and smoking cessation; health insurance navigation; asthma; and food resources.

Key partners: State of Vermont, Efficiency Vermont and other utilities, Vermont Health Department, University of Vermont Medical Center, One Touch, U.S. Department of Agriculture, a variety of local and regional programs.

Links to more information: Program information is available [here](#); One Touch system information is available [here](#); a One Touch referral guide of services offered is available [here](#).

Contacts: [Geoff Wilcox](#) (Vermont Weatherization Program), [Ellen Tohn](#) (Tohn Environmental/One Touch)

Washington State Weatherization Plus Health Initiative

Administrators: Washington Department of Commerce Energy Division (Housing Improvement Program), local WAP grantees

Current status: Pilot implementation and evaluation was completed in 2018.

The program was slated for expansion to other regions of Washington state, with an eventual goal of full state coverage. The pilot initiative was funded by the Washington State legislature, and local agencies have invested additional funds since 2017. Services offered may be locally tailored by WAP grantee region, but may include distribution of green cleaning kits, dust mite covers, walk-off mats, carbon monoxide detectors, and HEPA vacuum cleaners; carpet removal and floor replacement; moisture and mold reduction; ventilation improvements; and gutter and downspout repair and replacement.

Key partners: Washington State legislature; Matchmaker Program, WAP administrators

Links to more information: Wx+H information is available [here](#); the 2018 pilot implementation evaluation report is available [here](#). Information on the state Matchmaker Program for leveraging resources for low-income housing improvement is [here](#).

Contact: [Paul Currington](#) (Washington Department of Commerce)

North Carolina Community Action Association (NCCAA) Healthy Homes Initiative

Administrators: NCCAA, 22 local CAAs, Blue Cross and Blue Shield of North Carolina

Current status: Active

The NCCAA Healthy Homes Initiative (HHI) funds local CAAs to provide additional healthy homes services to income-qualified households across 94 counties in North Carolina, focusing on traditionally underserved rural areas. Services provided include a healthy home assessment, carpet removal/flooring replacement, pest control, air purifier installation, fall prevention, moisture control, carbon monoxide and smoke detector installation or maintenance, air filter replacement, and deep cleaning. The program is supported by funding from the philanthropic arm of Blue Cross North Carolina, which invested in this work following the success and benefits evaluation of similar work funded by Duke Energy's Helping Home Fund.

Key partners: NCCAA, local CAAs, Blue Cross North Carolina

Links to more information: NCCAA's current HHI Program information is [here](#); the evaluation report on precursor work funded by Duke Energy's Helping Home Fund can be downloaded [here](#).

Contact: [Joel Groce](#) (NCCAA)

ADDITIONAL READING AND RESOURCES

Evidence of Health Benefits of Weatherization and Other Healthy Homes Interventions

- Wilson, J., D. Jacobs, A. Reddy, E. Tohn, J. Cohen, and E. Jacobson. 2016. *Home Rx: The Health Benefits of Home Performance*. Washington, DC: U.S. Department of Energy. betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/Home%20Rx%20The%20Health%20Benefits%20of%20Home%20Performance%20-%20A%20Review%20of%20the%20Current%20Evidence.pdf.
- Tonn, B., E. Rose, B. Hawkins, and B. Conlon. 2014. *Health and Household-Related Benefits Attributable to the Weatherization Assistance Program*. Oak Ridge, TN: Oak Ridge National Laboratory. weatherization.ornl.gov/wp-content/uploads/pdf/WAPRetroEvalFinalReports/ORNL_TM-2014_345.pdf.
- E4TheFuture. 2016. "Occupant Health Benefits of Residential Energy Efficiency." e4thefuture.org/occupant-health-benefits-of-residential-energy-efficiency.
- Wilson, J., S. Dixon, D. Jacobs, J. Breyse, J. Akoto, E. Tohn, M. Isaacson, A. Evens, and Y. Hernandez. 2014. "Watts-to-Wellbeing: Does Residential Energy Conservation Improve Health?" *Energy Efficiency* 7 (1): 151–60. doi.org/10.1007/s12053-013-9216-8.
- Institute of Medicine. 2011. *Climate Change, the Indoor Environment, and Health*. Washington, DC: The National Academies Press. doi.org/10.17226/13115.

In-Home Asthma Mitigation Resources

- EPA (Environmental Protection Agency). 2005. *Implementing an Asthma Home-Visitation Program: 10 Steps To Help Health Plans Get Started*. August. www.epa.gov/sites/production/files/2013-08/documents/implementing_an_asthma_home_visit_program.pdf.
- NIH (National Institutes of Health). 2012. *Guidelines for the Diagnosis and Management of Asthma*. www.nlm.nih.gov/health-topics/guidelines-for-diagnosis-management-of-asthma.

In-Home Trip-and-Fall Mitigation Resources

- CDC (Centers for Disease Control and Prevention). 2015. *Preventing Falls: A Guide to Implementing Effective Community-Based Fall Prevention Programs*. www.cdc.gov/homeandrecreationalsafety/pdf/falls/FallPreventionGuide-2015-a.pdf.
- National Council on Aging. 2021. "Find an Evidence-Based Falls Prevention Program in Your Area.": Accessed February 22. www.ncoa.org/healthy-aging/falls-prevention/falls-prevention-awareness-week/how-to-get-involved/find-evidence-based-falls-program-area/.

In-Home Thermal Stress Resources

- CDC (Centers for Disease Control and Prevention). Heat-Related Illness. cdc.gov/pictureofamerica/pdfs/picture_of_america_heat-related_illness.pdf
- Lane, K., and K. Ito, S. Johnson, E.A. Gibson, A. Tang, and T. Matte. April 2018. "Burden and Risk Factors for Cold-Related Illness and Death in New York City." *International Journal of Environmental Research and Public Health*. 15(4): 632. ncbi.nlm.nih.gov/pmc/articles/PMC5923674/.

Other In-Home Health and Safety Program Resources

- NCHH (National Center for Healthy Housing). 2021. "The Principles of a Healthy Home." Accessed February 22. nchh.org/information-and-evidence/learn-about-healthy-housing/healthy-homes-principles/.
- Capps, L., L. Curry, and E. Levin. 2019. "Energy-Plus-Health Playbook." Vermont. VEIC. veic.org/clients-results/reports/energy-plus-health-playbook.

¹ See discussions of racial inequities in housing conditions and energy burdens in the following reports: S. Hayes and R. Denson, *Protecting the Health of Vulnerable Populations with In-Home Energy Efficiency: A Survey of Methods for Demonstrating Health Outcomes* (Washington, DC: ACEEE, 2019), www.aceee.org/research-report/h1901; A. Drehobl and L. Ross, *Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low-Income and Underserved Communities*. (Washington, DC: ACEEE, 2016), www.aceee.org/research-report/u1602

² See Asthma and Allergy Foundation of America on Asthma Disparities in America here: www.aafa.org/asthma-disparities-burden-on-minorities.aspx

³ ACEEE calculation using U.S. Census data. See page 3 here: S. Hayes and R. Denson, *Protecting the Health of Vulnerable Populations with In-Home Energy Efficiency: A Survey of Methods for Demonstrating Health Outcomes* (Washington, DC: ACEEE, 2019), www.aceee.org/research-report/h1901

⁴ See I Mikati, A. Benson, T. Luben, J. Sacks, and J. Richmond-Bryant, "Disparities in Distribution of Particulate Matter Emission Sources by Race and Poverty Status," *American Journal of Public Health*. 08, no. 4 (April 1, 2018): pp. 480-485. ajph.aphapublications.org/doi/10.2105/AJPH.2017.304297; A. Drehobl and L. Ross, *Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low-Income and Underserved Communities* (Washington, D.C: ACEEE, 2016), www.aceee.org/research-report/u1602; B. Hardy and T. Logan, *Racial Economic Inequality Amid the COVID-19 Crisis* (Washington, DC: Brookings Institute, 2020), www.brookings.edu/wp-content/uploads/2020/08/EA_HardyLogan_LO_8.12.pdf; E. Gould and V. Wilson, *Black workers face two of the most lethal preexisting conditions for coronavirus—racism and economic inequality*, (Washington, DC: Economic Policy Institute, 2020), www.epi.org/publication/black-workers-covid/

⁵ R. Sussman and M. Chikumbo, *How To Talk About Home Energy Upgrades*, (Washington, DC: ACEEE, 2017), www.aceee.org/research-report/b1701.

⁶ 2019 WAP Fact Sheet: www.energy.gov/sites/prod/files/2019/07/f64/WAP-Fact-Sheet-2019.pdf; for complete guidance on allowable services, see [DOE WAP Guidance on Health and Safety Issues](http://www.energy.gov/sites/prod/files/2019/07/f64/DOE_WAP_Guidance_on_Health_and_Safety_Issues.pdf)

⁷ See pages 11-12 www.pse.com/-/media/Project/PSE/Portal/Rate-documents/EES/ees_2020_2021_biennial_conservation_plan.pdf

⁸ See presentation providing program overview from July 2020, beginning on slide 34 here: www.energy.gov/sites/prod/files/2020/08/f77/bbrn-peer-ee-funding-072320.pdf

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