BRAIDING ENERGY AND HEALTH FUNDING FOR IN-HOME PROGRAMS: FEDERAL FUNDING OPPORTUNITIES

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Contents

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Executive Summary

KEY TAKEAWAYS

- By providing preventive health services in conjunction with energy-saving measures, programs can maximize societal benefits and combine financial resources from the health and energy sectors.
- Combining funding streams can improve program efficiency and help target and expand services for both sectors, reaching more households and providing more services to those who can benefit most from in-home interventions.
- The federal funding sources identified here represent billions of dollars from sources not traditionally used for energy efficiency. Such sources could potentially be used to make people's homes healthier and safer though weatherization and/or complementary services.

Each year, Americans spend billions of dollars treating preventable illness and injury that could be avoided or mitigated through in-home interventions that preventively address health hazards found in the home. Preventive approaches to health care are a widely accepted and preferred method of protecting health, but the health sector does not yet have a mechanism to deploy these solutions at scale. The health inequities revealed by the COVID-19 pandemic highlight the urgent need to rectify the underlying conditions that make certain communities particularly vulnerable to health harms.

By providing preventive health services in conjunction with energy-saving measures, programs can maximize societal benefits and potentially combine significant financial resources from the health and energy sectors. The identification of new opportunities to leverage funds and program infrastructures through partnership opportunities in the health sector can expand the reach of preventive in-home services at a moment when the need for these services is becoming increasingly clear.

The existing network of U.S. energy efficiency and weatherization programs offers a new channel for delivering preventive health services outside of hospitals and clinics. Every family living in a home served by an electric or natural gas provider can potentially be reached through this expansive network. Combining funding streams could help expand services, in terms of both the numbers of homes reached and the extent of services provided.

Figure ES-1 below illustrates some of the different types of funding that might be braided together to provide the basic elements of an in-home program that addresses both health and energy. These funding sources might be used for various initiatives, such as reimbursing a program for in-home services, piloting a new program, expanding services in an existing program, educating program participants, and evaluating a participant's in-home needs.

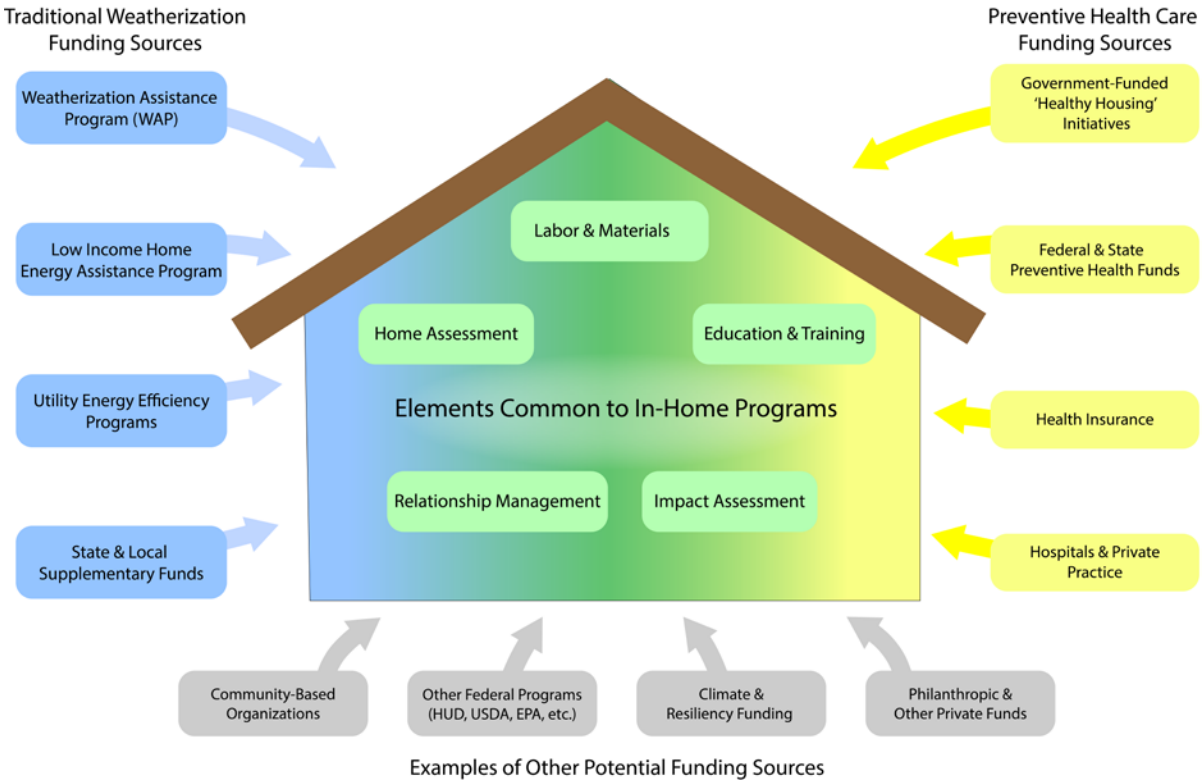

Figure ES-1. Energy efficiency and health sector funding sources that might be braided together to support program elements common to the work of both.

Combined funding can be used in many ways to support a variety of expanded services. For example, older adults are particularly susceptible to health harms both from extreme heat and cold and from falls. To address this, an in-home program might provide insulation and air sealing, and replace or repair heating and cooling equipment, all of which will help to minimize exposures to extreme temperatures. While this work is being done, service providers could also reduce fall risks by improving or adding lighting and handrails, providing education, and removing trip hazards. Moreover, public trust in healthcare providers gives them a potential role as powerful champions of expanded healthy housing and energy efficiency programming, which could inspire policymakers' support.

This report focuses on several promising sources of nationally available federal funding that might be combined with energy efficiency funding to expand program services and reach. To identify these opportunities, we reviewed programs across multiple federal agencies. We then narrowed our preliminary list, retaining those that had either a) allowed funds to be used for energy-related investments or b) provided funds for complementary activities that could be used to expand a home energy program's health benefits and services. Examples of such complementary activities include in-home health and safety measures and participant education. We further refined the list based on input from a group of external advisors. Here, we highlight the resulting six opportunities, which are outlined in Table ES-1.

Table ES-1. Overview of surveyed federal funding and support opportunities relevant to in-home programs.

Opportunity	Administering agency	Scale of program funding	Potential uses of funding
Medicaid	CMS (HHS)[1]	$593 billion annual budget; potential for preventive spending uncapped	Home assessment, relationship management, labor/materials, education/training, and impact assessment
CHIP Health Services Initiative (HSI)	CMS (HHS)	Approximately $956 million nationally based on 2018 numbers; varies by state (scaled to CHIP allotment and administrative costs) and by Congressional budgetary actions	Home assessment, relationship management, labor/materials, education/training, and impact assessment
Preventive Health and Health Services Block Grant (PHHSBG)	CDC (HHS)[2]	$147 million disbursed in 2019 as part of annual grant cycle	Home assessment, relationship management, labor/materials, education/training, and impact assessment
Social Impact Partnerships to Pay for Results Act (SIPPRA) Grants	Dept. of the Treasury	$100 million to be awarded as one-time grants in multiple funding rounds; next opportunity will be approximately $10 million	Home assessment, relationship management, labor/materials, education/training, and impact assessment
Lead Hazard Control Grants	OLHCHH (HUD)[3]	$324 million total awarded as renewable grants of $1–9.1 million to be used over up to five years	Home assessment, labor/materials, and impact assessment
National Asthma Control Program (NACP)	CDC (HHS)	$70 million total awarded as five-year grants allotted to approximately 24 states; variable funding scaled to population ($100,000–800,000/year/state)	Home assessment, relationship management, labor/materials, education/training, and impact assessment

[1] Centers for Medicare and Medicaid Services, Health and Human Services. [2] Centers for Disease Control and Prevention. [3] Office of Lead Hazard Control and Healthy Homes, Department of Housing and Urban Development.

The funding sources we highlight in this report are administered by federal agencies, including offices within the Departments of Health and Human Services (HHS), Housing and Urban Development (HUD), and Treasury. Directing just 1% of the annual Medicaid budget to preventive in-home programs would make $590 million available for these types of services. Combined with the five other funding sources described here, this represents the opportunity to unlock a combined total of more than $2 billion in annual funding. This is not funding currently being used to support energy efficiency; rather, this sum represents a potential that exists if we use currently available funds to provide in-home services to preventively address illness and injury by making people's homes healthier and safer.

The procedures and conditions required to obtain funds vary by program. All of these opportunities require coordination with a state or local government agency to apply for and

use the funds, and many require a matched funding percentage from the applicant. We encourage program administrators to consider the financial resources highlighted in this report in conjunction with a variety of other strategies for braiding funding. First, we recommend that program administrators and policymakers design programs with elements that will make them attractive collaborators to health-focused partners. Examples include offering services that can maximize health impacts, measuring and demonstrating health outcomes, and quantifying the monetary value of health impacts attributable to the program. We also encourage program administrators to continually hunt for new opportunities and to consider sources of funding earmarked for health and social welfare, even if they do not specifically identify saving energy as a goal. Finally, we encourage program administrators to carefully consider the holistic needs of the communities they serve, particularly those that are disproportionately burdened with health harms, energy costs, environmental hazards, inadequate housing, and climate threats. By weaving together resources from the health and energy sectors, programs can access greater funding opportunities, expand services, and reach more households in need; such an integrated approach can yield environmental, economic, and health benefits, particularly for vulnerable communities.

Introduction

In the United States, 1 out of every 12 people suffers from asthma (CDC 2019a, 2019b). Each year, 30 million older adults experience falls that result in about 30,000 deaths (Burns, Stevens, and Lee 2016) and 3 million visits to emergency departments (CDC 2019c). In a single year alone, more than 12,000 U.S. hospitalizations were related to excessive heat or cold (Merrill, Miller, and Steiner 2008); as climate change worsens, the threat posed by extreme temperatures is forecast to grow significantly (EPA 2016).

Many types of health harms—including those described above—can be avoided or reduced by taking preventive actions in a person's home (Allen et al. 2017, 2019). Although changes to the built environment can have major impacts on human health, doctors, hospitals, and other public health professionals are rarely empowered with the resources to make such changes. The U.S. health care system's resources are primarily invested in reactive services that treat people once they become ill or injured (Levine et al. 2019). In contrast, preventive approaches keep people healthy, thus reducing illness, injury, and death; they also reduce burdens on the health sector, improve the resilience of communities, and save money. Table 1 shows the annual health costs of just three types of preventable[1] health harms and the numbers of people they impact nationwide.

Table 1. Typical costs and national impacts of common injuries preventable through in-home interventions

Injury	Annual U.S. health system cost	Average cost per hospitalization	Affected U.S. population
Asthma	$82 billion[a]	$25,497[d]	27,240,000[g]
Falls	$50 billion[b]	$32,918[e]	More than 30 million[h,i]
Thermal stress	$120 million[c]	$10,072 (hypothermia); $6,189 (heat stress)[f]	Hypothermia: more than 17,000 emergency visits and 1,300 deaths annually,[j] with as many as 23%[k] of cases occurring indoors Heat stress: more than 61,000 emergency visits and 650 deaths annually,[l] with as many as 80%[m] of these cases occurring indoors

[a]Nurmagambetov, Kuwahara, and Garbe 2018; [b]CDC 2017; [c]Merrill, Miller, and Steiner 2008; [d] Wang et al. 2014; [e] Burns, Steven, and Lee 2016; [f] HCUP 2018; [g] CDC 2019a; [h] CDC 2015; [i] CDC 2017; [j] HCUP 2018; [k]extrapolated from CDC 2006 [l] HCUP 2018; [m] Based on NYDHMH data.

The costs in table 1 are based on national averages, but the burden of these preventable health harms is not borne equally. Many diseases—including asthma, diabetes, obesity, hypertension, and stroke—are experienced at higher rates by communities of color (Akinbami et al. 2012; Witters and Wood 2014; Go et al. 2013; Price et al. 2013; Howard et al. 2011; Artiga and Orgera 2019). The COVID-19 pandemic starkly illustrates the particularly

[1] An asthmatic patient's frequency of asthma attacks may be reduced by reducing exposure to environmental triggers. These triggers may include conditions in the home that can be addressed by a range of in-home mitigation measures, from mold remediation and moisture exclusion to pest control and allergen removal (Krieger et al. 2010). For a more detailed discussion of the potential for in-home remediation of asthma triggers in the weatherization context, see Hayes, Kubes, and Gerbode 2020.

tragic effects that overburdened communities experience,[2] with housing conditions, environmental exposures, and economic insecurities making them more vulnerable to health threats. It is well established that communities of color are exposed to greater levels of air pollution, a factor that has been linked to increased deaths from COVID-19 (Maroko, Nash, and Pavilonis 2020; Wu et al. 2020). Black families are 60% more likely than white families to be living in inadequate housing conditions (Census Bureau 2020),[3] and black and Puerto Rican children suffer from asthma at significantly higher rates than white children (CDC 2019b). Now more than ever, as people are required to stay in their homes, a healthy home—that is, a safe space free of mold, toxins, and other environmental harms—where people can safely shelter is vitally important. By weaving together resources from the health and energy sectors, programs can access greater funding opportunities, expand services, and reach more households in need; an integrated approach can yield environmental, economic, and health benefits, particularly for vulnerable communities.

The United States' national network of energy efficiency and weatherization programs offers a promising new channel for delivering preventive services outside of hospitals and clinics. Every family living in a home with electricity or natural gas service can potentially be reached through this expansive network by virtue of their established relationships with utility companies. As two recent ACEEE reports revealed (Hayes and Denson 2019; Hayes, Kubes, and Gerbode 2020), a growing body of evidence documents positive health outcomes correlated with a range of in-home weatherization programs. These programs can improve resident health outcomes by, for example, reducing the frequency of asthma attacks and other respiratory illnesses, as well as exposures to extreme heat and cold. Program participants frequently report improved comfort and health including reduced sick days, hospitalizations, and days of missed work or school. They also experience reduced energy costs and, consequently, improved economic security; for some families, this improvement makes it possible to afford needed food or medicine. By combining funding streams, these programs represent an opportunity to vastly expand both the number of people with access to in-home preventive services and the quality of services people receive.

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[2] At the time of writing this report (May 2020), deaths from COVID-19 in communities of color have been disproportionately high. One study shows that black Americans are 3.5 times more likely to die from COVID-19 than white Americans and that Latinx individuals are more than 1.8 times more likely to die compared to whites (Gross et al. 2020). In Chicago, 46% of people who died from COVID-19 were black and 28.3% were Latinx (CDPH, 2020). In New York State, the Latinx population makes up 19.2% of the total state population but 29.5% of state COVID-19 deaths (APM Research Lab 2020). In Washington DC, blacks are six times more likely to die from COVID-19 than are whites, while in Michigan, black residents are more than seven times more likely to die from COVID-19 than are white residents (Gross et al. 2020).

[3] ACEEE calculation using U.S. Census data. A discussion of the conditions that are considered in identifying inadequate housing can be found at census.gov/content/dam/Census/programssurveys/ahs/publications/HousingAdequacy.pdf (Eggers and Moumen 2013).

SCALE OF BRAIDED FUNDING OPPORTUNITIES

Each year, utilities and the Weatherization Assistance Program (WAP) spend approximately $1.7 billion on residential programs.[4] It is difficult to quantify the health sector dollars that might be available for preventive funding because those dollars come from a wide variety of sources including private medical insurance, Medicaid, hospitals, philanthropic grants, and government programs. Table 1 shows the scale of health spending on health harms that are preventable through home modifications and helps us understand the magnitude of funds that might be available.

Most energy savings programs are not designed with a full complement of measures to address asthma and falls, but adding the elements needed—education, assessment, handrail installation, trip-hazard removal, and allergenic pillowcases—would cost less than a $25,000–33,000 hospital visit for asthma complications or a fall (see table 1). Avoiding illness or injury with preventive measures typically costs less than the treatment and recovery of a person who is ill or injured.

Most importantly, people are better served by prevention than by treatment for illness and injury. The 2010 Patient Protection and Affordable Care Act (ACA) strongly emphasized the development of preventive care infrastructure and strategic preventive health planning at the national scale (e.g., NPC 2012). This shift toward prevention could radically reshape the conversation about spending on proactive health measures, opening the door to new collaboration levels based on the values of avoided health harms. With just a fraction of the dollars spent on reactively treating these harms, we could dramatically ramp up the in-home preventive services and measures that so many people need.

A recent ACEEE report (Hayes, Kubes, and Gerbode 2020) estimated and monetized the health benefits of incorporating measures to target specific environment health harms into the existing network of in-home energy efficiency programs, thereby maximizing improved health outcomes for participants. The report estimates that in addition to the energy and environment benefits, the health benefits for program participants due to improved living conditions could accrue on the scale of $228 million in a single year if we addressed only asthma, falls, and thermal stress through the current network of in-home programs. Table 2 shows the estimated cost savings for these preventable health harms.

[4] To estimate spending, we take total spending by utilities on residential electric energy efficiency from ACEEE's *2019 State Scorecard* report ($6.6 billion) and multiply it by the percentage of utility residential spending (30%) that is invested in home retrofits (55%) (Berg et al. 2019). (These percentages—whole home 29% + prescriptive 26%—are from the Billingsley et al. 2014 report *The Program Administrator Cost of Saved Energy for Utility Customer-Funded Energy Efficiency Programs*.) To this, we add WAP spending of $224 million and Low Income Home Energy Program (LIHEAP) weatherization spending of $423 million from the National Association for State Community Services Programs (NASCSP) annual spending (NASCSP 2019).

Table 2. Potential for avoided health costs from addressing select health harms with in-home energy efficiency programs (in 2019 dollars)

Hazard type	Costs avoided in first year	Costs avoided after 10 years
Trip and fall	$177,200,000	$2,180,000,000
Asthma	$38,500,000	$593,000,000
Exposure to extreme cold	$8,000,000	$73,000,000
Exposure to extreme heat	$4,600,000	$41,000,000
Total	$228,000,000	$2,888,000,000

Source: Hayes, Kubes, and Gerbode 2020

However, these conservative numbers dramatically underestimate the true potential of these in-home interventions, in part because they are based on the energy efficiency programs' current rates of market penetration. Although the energy efficiency network is capable of reaching into virtually every home, uptake of residential energy efficiency programs remains low: Less than 1% of households nationwide receive services each year, at a cost of approximately $1.7 billion.[5] Further, if programs incorporated some of these preventive services, they could market them to families who need them, which would substantially increase the benefits. For instance, approximately 1 in 12 people have asthma. Our table 2 calculations are based on the assumption that 1 in every 12 people currently being served by an in-home energy-saving program would benefit from asthma services. If these programs shifted their outreach to maximize their health impacts, they could prequalify participants so that 100% of households served include a member suffering from asthma. They could also partner with a local asthma clinic to identify the households where someone suffering from asthma is experiencing frequent hospital or emergency room visits due to environmental triggers. These approaches could exponentially increase the health benefits that programs might achieve.

PROGRAM EFFICIENCIES FROM COMBINING FUNDING AND RESOURCES

A program that combines health and energy resources may do so in a variety of ways. Health funding might be used to reimburse in-home services, pilot a new program, expand services in an existing program, provide education to program participants, evaluate a participant's in-home needs, and more. Programs might be designed to directly incorporate multiple services, or services might be delivered through cooperative arrangements, mutual referrals, or other types of administrative coordination between programs or providers.

Combining multiple types of services into a single program can reduce total program costs and overhead through program efficiencies. By braiding resources together, the funding available to separate initiatives targeting the same issue could be stretched further. While programs can vary significantly, figure 1 illustrates some of the program elements common among services provided by different types of in-home programs: an asthma mitigation

[5] See ACEEE calculation as described per footnote 4 and *Unlocking Ultra-Low Energy Performance in Existing Buildings* (Amann 2017).

program, an energy-saving program, and a fall-prevention program. Although the educational content or specific labor and installation work provided by each program type might be quite different, there is potential for administrative and operational efficiencies by bringing together these different services into a single in-home program.

For example, whether a program targets a family's asthma triggers, energy needs, or fall risks, all three types of programs would likely begin with a needs assessment. For in-home services, this kind of assessment typically entails a visit to the home during which hazards, health risks, and opportunities to improve health are identified and documented. An asthma program might identify asthma triggers, such as mold or pest issues, while a fall-prevention program might identify trip hazards, structural deficiencies, and poor lighting. A typical energy efficiency program includes a home energy audit to identify energy-saving opportunities.

If a program were to incorporate all of these elements into a single inspection, this work could be completed in a single home visit, reducing the expense of sending three separate people to the home for three separate assessments (and reducing the associated logistical burden on a resident who may need to coordinate and be present for each visit). Similar synergies exist across a program's other phases, including management of the client/participant and subcontractor relationships, education of the family or program participants, installation of mitigation measures, and a follow-up assessment of the impact.

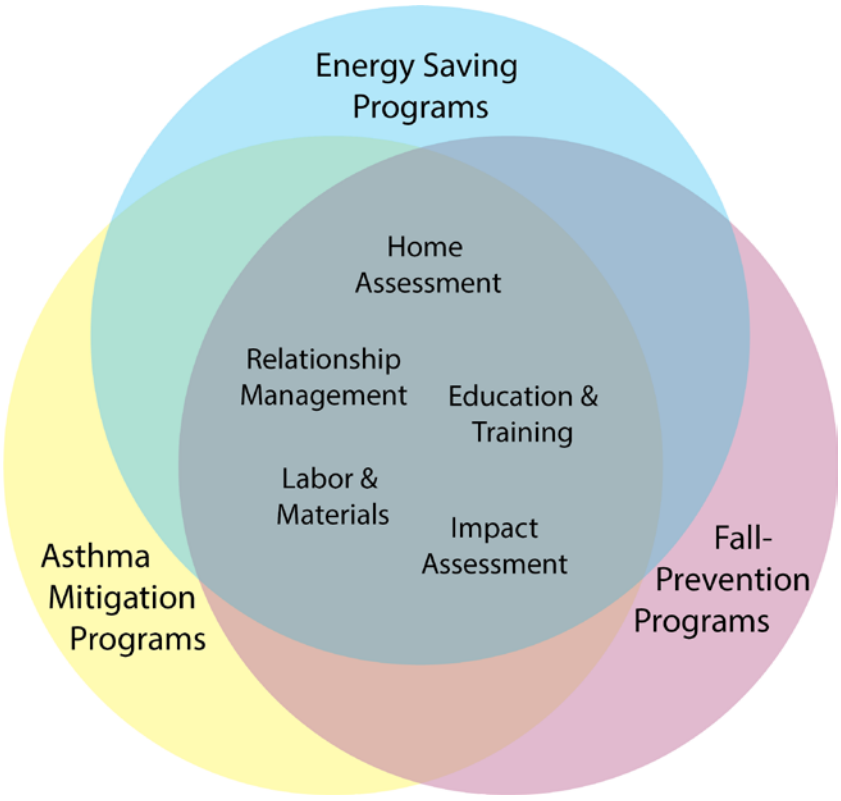

Figure 1. Elements common to different types of in-home programs

Figure 2 presents different funding sources that might be combined within an in-home energy and health program.

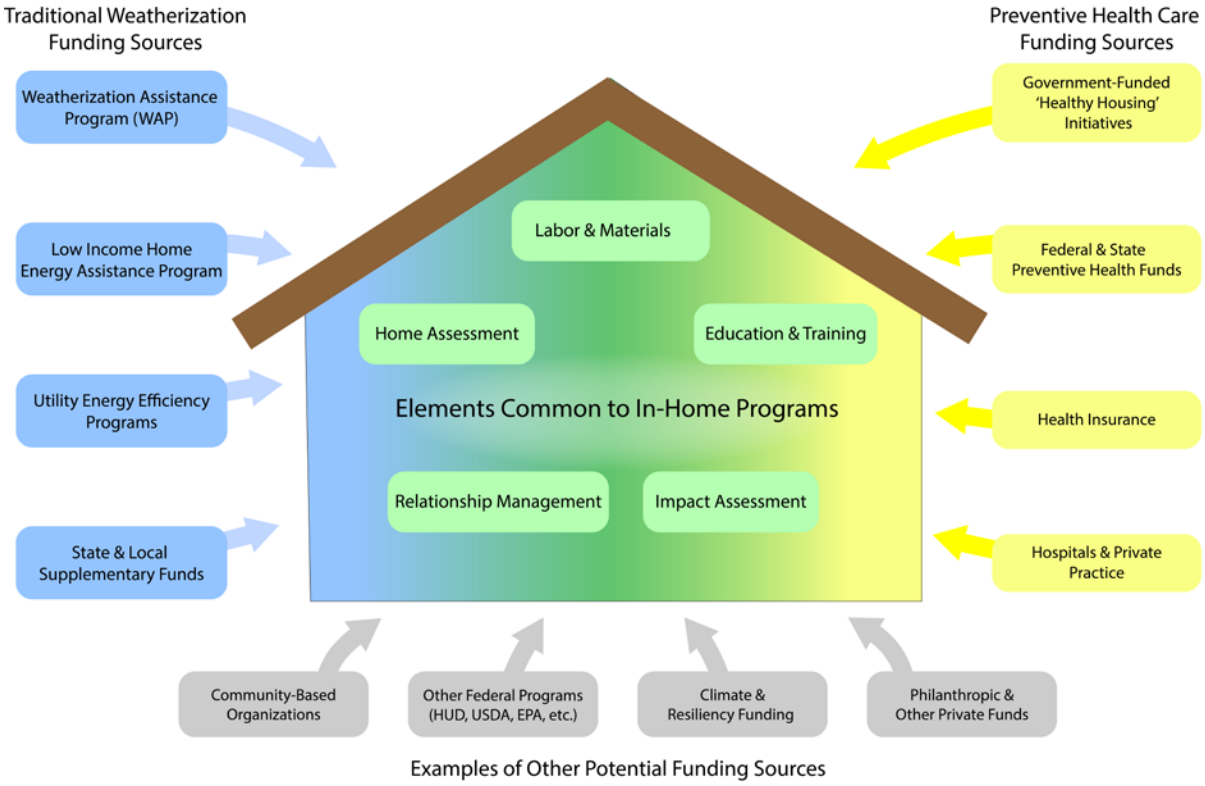

Figure 2. Sources for braiding traditional weatherization funding with preventive health care funding, as well as program elements common to both in-home energy and health programs

ESTABLISHED AND NEW OPPORTUNITIES FOR BRAIDING WEATHERIZATION PROGRAM FUNDING

Well-established federal funding programs, including WAP and the Low Income Home Energy Assistance Program (LIHEAP), have been supporting energy efficiency investments for decades. WAP is a Department of Energy (DOE) program that provides funding for home energy efficiency measures, including both weatherization and mechanical system repair. Launched in 1976, WAP has provided funding or training to community action agencies and other local program implementers, resulting in the weatherization of more than 7 million homes (DOE 2020).

A 2016 report by the White House Council of Economic Advisors states that temporary additional funding through the American Reinvestment and Recovery Act of 2009 supported the weatherization of more than 800,000 additional homes, leading to more than 1 million homes being served by WAP from 2009 to 2012 (CEA 2016). WAP is often co-administered with and closely linked to LIHEAP, which is funded by the Department of Health and Human Services (HHS). While LIHEAP primarily supports subsidies for home power and heating for low-income groups, it allows a percentage of its funds to be allocated

for weatherization and direct in-home interventions (Administration for Children and Families 2018).

What Does a Weatherization + Health Collaboration Look Like?

Many pilots and early-phase programs combining or coordinating weatherization and other in-home health services have been implemented over the last few years. Several of these are now undergoing retrospective analysis and impact assessment of their initial operation period. VEIC's *Energy-Plus-Health Playbook* catalogs a number of these programs, including the following.

Washington State Weatherization + Health[a]

A 2015 Washington state legislative move directed more than $4 million in competitive grants to fund partnerships between clinical practitioners, home retrofitters, and community service organizations. The resulting programs empowered clinicians and others to refer participants for a range of coordinated services including comprehensive in-home repairs and community health worker visits.

Healthy Homes Vermont[b]

Efficiency Vermont has established several initiatives to combine healthy homes principles into efficiency work and services. In 2016, NeighborWorks of Western Vermont developed collaborative programming to link energy efficiency incentives from Efficiency VT with in-home asthma care programming from a regional medical center and other community development funding. Efficiency VT launched the larger Healthy Homes Vermont pilot based on this model in 2018.

[a] Washington Wx + H program information page is at www.commerce.wa.gov/growing-the-economy/energy/weatherization-and-energy-efficiency/matchmaker/weatherization-plus-health-wxh.

[b] More information on the Healthy Homes Vermont program history and development is at www.efficiencyvermont.com/news-blog/whitepapers/healthy-homes-vermont-2019.

For more information on these and other intersectional programs with varying degrees of linkage between health and energy practitioners, see the collected case studies in Section 6 of the *Playbook* (Levin, Curry, and Capps 2019).

The 2017 WAP program budgeting survey of DOE-funded weatherization programs (conducted annually by the National Association for State Community Services Programs) demonstrates that these programs are already leveraging significant funding from other sources, including state and local government funds, utilities, and private philanthropy and community development organizations (NASCSP 2019). The same survey estimated that every dollar DOE spends on weatherization through these programs is matched by $3.04 dollars in external sources of leveraged funding from other federal and nonfederal sources. The extent of current leveraging shows that the weatherization sector already has a great deal of experience with (and dependence on) braided funding. The natural alignment of weatherization programs with health services presents a new frontier of opportunity to expand the reach of both sectors.

Now more than ever, there is immense need to expand this reach. As detailed earlier, the COVID-19 crisis has exposed the intertwined relationship of housing, energy, and health. This increased public understanding presents an opportunity to expand equitable preventive health services, creating healthy homes and cost savings while simultaneously improving the health of vulnerable populations and avoiding hospitalizations.

This report identifies nontraditional sources of federal funding that might be available to support energy efficiency programs on the basis of their health benefits, potentially allowing the braiding of additional health-related funding resources with more traditional energy efficiency programs. Here, we highlight six federal funding opportunities that could potentially fund

programs that provide services related to energy efficiency. These federal opportunities link existing programs into new networks of resources and participants, providing reimbursement for home interventions, funding for new programs and experimental pilots, and so on. All of these opportunities require coordination with a state or local government agency to apply for and use the funds, and many require applicants to match a funding percentage.

These federal opportunities are places to start the search for funds and support. Not every example will be readily accessible to every program. Federal grants are limited funds that are competitive and typically nonrenewable, and some of the examples require state-level regulatory changes. So, while not every opportunity here will be a fit for every program, taken together, the examples illustrate elements that can make a program eligible for these types of funds, as well as programmatic goals that might align well with the funding sources. We encourage readers to use this resource to help inform their development of a customized strategy that identifies local- and state-level funding sources to pursue in tandem with federal opportunities.

Research Approach

We identified the opportunities highlighted in this report through Internet research, review of agency websites and federal grant opportunities, interviews with agency staff, and consultation with program administrators and industry experts. We began by looking at funding opportunities provided by federal agencies, including both explicitly health-focused institutions, such as the Centers for Disease Control and Prevention (CDC), and executive arms with a broader focus, such as HUD.

We sorted the list of funding opportunities and retained those that had either a) allowed funds to be used for energy-related investments, or b) provided funds for complementary activities that could be used to expand the health benefits and services of a home energy program. Examples of these types of complementary activities include in-home health and safety measures, participant education, and program evaluation. Based on these criteria, we identified an initial list of opportunities. We then further refined that list based on input from an external advisory group representing a range of energy- and health-adjacent organizations and companies. Appendix B lists members of this group and their affiliations.

In the following, we highlight six potential funding opportunities. We have not identified every possible federal funding source here, and new opportunities are likely to emerge over time.

Our goal is to provide information that program administrators can use to pursue these funding sources. This information, however, represents our interpretation of how these opportunities might be applied to programs with an in-home energy efficiency retrofitting component. Experiences will likely vary when applying for these different funding opportunities.

Federal Funding Opportunities

The funding sources we highlight in this report are administered by various federal agencies including:

- Centers for Medicare and Medicaid Services (CMS) within HHS
- The CDC within HHS
- The Office of Lead Hazard Control and Healthy Homes (OLHCHH) within HUD
- The Office of Economic Policy within the Department of Treasury

Directing just 1% of the annual Medicaid budget to preventive in-home programs would make $590 million available for these types of services. Combining this with the five other funding sources described here could unlock a total of more than $2 billion annually for funding innovative nontraditional health programs or supporting coordination aimed at improved health outcomes. Such an amount would not necessarily be used to directly support energy efficiency; rather, the sum represents the scale of potential support for providing preventive measures, including in-home services.

A wide range of federal programs exists to support public health through federal partnerships with state agencies or entities. There are also a number of federal programs that directly fund the development of projects or pilot programs with potential benefits to health and well-being. Medicaid and the State Children's Health Insurance Program (CHIP) are two large, closely related programs that provide funds to help states pay for health care and related costs for eligible groups including low-income families and children. State plans primarily determine which services are covered (and for whom).

Other programs, including the Preventive Health and Health Services Block Grant (PHHSBG) and the National Asthma Control Program (NACP), disburse funds to state agencies and other partner organizations for a more limited range of purposes. These grants and partnerships fund initiatives related to the support, coordination, and expansion of health initiatives and interventions, including the support of community-based programs. A home energy efficiency program might be able to access funding or nonmonetary support through the networks sustained by these grants. Two closely related lead-control grants (coordinated by OLHCHH) represent an opportunity to obtain funds supporting lead remediation and a range of other healthy housing work. Further, a newly created Treasury program initiated through the Social Impact Partnerships Pay-for-Results Act (SIPPRA) funds local and state projects that can demonstrate reduced government spending through socially beneficial results, including positive health outcomes (U.S. Congress 2018).[6]

Table 4 briefly summarizes each federal funding opportunity; we then offer an FAQ-style list of details on each program's structure, history, available funding amounts, and potential uses relevant to weatherization and related housing upgrades. This list includes a summary

[6] 42 U.S.C. §§ 1397n-1397n-1397n-13. For a summary of the act, see home.treasury.gov/services/social-impact-partnerships/sippra-pay-for-results.

of whether the funds can be used for programmatic expenses such as home assessments, relationship management, education, labor and installation, and impact assessment. We also include information on who can apply, how they can do so, and who (or what office) to contact for more information, along with other resources for further details. Where possible, we offer examples of how each funding type has been applied to housing-related interventions. Further, as table 3 shows, we created five categories to describe how funds might be used in a program. However, use of these funding sources by energy programs is emerging or untested. So, in some cases, we list uses that we think would be eligible for funding based on publicly available grant descriptions and the ways in which existing programs have used the funds.

Table 3. Potential uses for braided federal funding

Potential use	Description
Home assessment	An initial visit or series of visits to understand the current state of housing or resident health and identify opportunities for remediation or improvements
Relationship management	Communication with program participants and partners, along with some aspects of program administration
Education and training	Encompasses health- or energy-related education for program participants, contractors, or others who will carry out program work
Labor and materials	Materials and labor to alter the home environment and/or-remediate in-home hazards
Impact assessment	Post-work evaluation of changes to housing conditions or changes in resident health and well-being

Table 4. Overview of federal funding opportunities described in this report

Name of opportunity	Agency	Applicability	Previously demonstrated uses	Scale of funding	Potential funding uses
Medicaid	CMS (HHS)	Potential for reimbursement of in-home modifications; new program funding models	A variety of funding approaches have been used, including reimbursement for assessments and energy measures and program administration.	$593 billion annual budget; potential for preventive spending uncapped	Home assessment, relationship management, labor/materials, education/training, and impact assessment
CHIP Health Services Initiative (HSI)	CMS (HHS)	Mechanism for unlocking funding for state-backed initiatives that provide a broad array of preventative and treatment services	Several states have created HSIs that fund in-home modifications to protect health.	Annual fund, with approximately $956 million available nationwide in 2018; amounts vary by state based on total CHIP budget and administrative costs	Home assessment, relationship management, labor/materials, education/training, and impact assessment
Preventive Health and Health Services Block Grant (PHHSBG)	CDC (HHS)	Grant funds for states for underserved areas of public health	A wide variety of locally beneficial community health programming has been supported.	$147 million disbursed in 2019 as part of an annual grant cycle	Home assessment, relationship management, labor/materials, education/training, and impact assessment
Social Impact Partnerships to Pay for Results Act (SIPPRA) Grants	Dept. of the Treasury	Support for projects that can demonstrate the ability to reduce the need for other federal spending, including on health care	Although grants have not yet been awarded, the program is expected to solicit applications for socially beneficial pilot programs.	$100 million to be awarded as one-time grants in multiple funding rounds; next round will award approximately $10 million	Home assessment, relationship management, labor/materials, education/training, and impact assessment
Lead Hazard Control Grants	OLHCHH (HUD)	Funding for home assessments and hazard remediation	These grants support lead hazard assessment and mitigation, as well as healthy homes work.	$324 million total, awarded as renewable grants of $1 million–9.1 million that can be used over five years	Home assessment, labor/materials, and impact assessment
National Asthma Control Program (NACP)	CDC (HHS)	Coordination funds and resources for in-state networks of asthma responders and services, with guidance emphasizing the built environment	This program funds state infrastructure to support coordination with community health and development groups.	$70 million available in 2019 awarded as five-year grants; grants have been awarded to approximately 24 states with funding scaled to population ($100,000–800,000/year/per state)	Home assessment, relationship management, labor/materials, education/training, and impact assessment

MEDICAID

Medicaid is a health coverage program funded jointly by states and the federal government. The program is administered by states according to federal guidance and serves low-income adults, children, pregnant women, elderly adults, and people with disabilities. Most state Medicaid programs administer services through contracts with managed care organizations (MCOs), which provide coverage for Medicaid enrollees in exchange for a monthly payment per member.

Medicaid is one of the largest sources of federal funding for health care. Along with Medicare and CHIP (see next section), Medicaid provides reimbursement or cost matching for medical care for vulnerable groups, particularly low-income groups within certain age limits or other restrictions as defined at the state level. The program can also provide reimbursement and funding for a limited number of nontraditional health interventions. Medicaid has the potential to be used to support in-home services that mitigate or prevent health harms; energy efficiency and weatherization programs may be able to access funds on the grounds that they function as preventive health care or to supplement their existing services by funding health interventions through Medicaid.

Examples of How These Funds Have Been Used

In each of the following cases, programs were reimbursed through Medicaid mechanisms for in-home health services that were either directly related to weatherization (as in NYSERDA) or complementary (as in IMPACT DC).

New York State Healthy Homes Value-Based Payment Pilot

The New York State Energy Research & Development Authority (NYSERDA) runs a program to facilitate the reimbursement of energy efficiency services along with a range of other complementary in-home health interventions to several hundred households. These include physical home repairs and remediation as well as nonstructural services such as patient and family education in asthma management. These services are currently funded by the state's Clean Energy Fund; MCOs may eventually reimburse some costs. (Drawn from Levin, Curry, and Capps 2019)

IMPACT DC Asthma Clinic

While not itself an in-home service provider, the IMPACT Clinic plays a key role in helping connect asthmatic patients to in-home assessors and service providers to improve the health of their home environments; it also educates patients and their families about the importance of addressing these conditions and triggers. Services include, for example, referrals to assessors who can ultimately request that the DC Department of Energy and the Environment (DOEE) formally document in-home health issues such as pest management problems; structural deficiencies, such as holes in the walls; and other conditions that could exacerbate asthma (while also causing home energy waste). The DOEE in turn can report these findings to property owners and guide them through the process of making needed repairs that could tangibly improve their tenants' health.

IMPACT DC receives some direct reimbursements for services from the local DC MCOs; it also receives some contracted payments from MCOs that represent part of the avoided cost of reduced asthma emergency visits. (Drawn from NCHH 2016)

Medicaid supports health care through a complex bundle of providers and services, and program implementation approaches vary significantly across states. Medicaid has several mechanisms that could be used to fund nontraditional home intervention programs that support both health and housing improvements. We include information on three such programs—MCO contracts, 1115 Waivers, and State Plan Amendments (SPAs)—that could be used to support in-home preventive services offered in conjunction with an in-home energy-saving program. We also

refer readers to pre-existing guidance documents and tools related to accessing funding through Medicaid in the context of healthy housing more generally (for example, see GHHI 2020a; NCHH 2020).

MANAGED CARE ORGANIZATION (MCO) CONTRACT

Most Medicaid enrollees are served by an MCO, which is contracted by a state to provide services. Through these contracts, states have the authority to offer nontraditional medical programs and services such as preventive, in-home programs. A state Medicaid office can request that MCOs support these types of programs.

STATE PLAN AMENDMENT (SPA)

Each state develops and maintains a State Plan, which describes groups of individuals to be covered, services to be provided, and methodologies to reimburse providers. An SPA can be submitted to redefine or alter the groups eligible for coverage within the state or to change the types of services covered. These SPAs are submitted to CMS for approval and reflect long-term or indefinite changes to the state's coverage plan. An SPA could allow new types of services, including in-home measures, to be reimbursed by Medicaid.

1115 WAIVER

State Medicaid offices can seek an 1115 Waiver to test new ways to deliver and pay for health care services by providing services not typically covered. These waivers are typically focused on pilot or demonstration programs that test innovative or nontraditional care approaches, and they typically start with a limited approval period subject to extension (MACPAC 2016).

While federal and state spending for Medicaid is on the order of hundreds of billions of dollars per year, it is likely that only a fraction might be realistically available as reimbursement to a nontraditional health program through an 1115 Waiver (Rudowitz et al. 2019). The program's scale, however, means that diverting just 1% of its funds to preventive in-home services would translate to more than half a billion dollars.[7] This would represent a large redirection of existing spending, but the scale of potential savings from implementing preventive programs make such a proposal attractive. The health issues potentially mitigated or prevented by these programs already cost Medicaid many billions of dollars per year. In 2015, approximately 8% of Medicaid spending for older adults—some $8.7 billion—was related to treating nonfatal falls alone (Florence et. al 2018). Similarly, asthma treatment represents a significant percentage of Medicaid spending already: In 2013, New York's state Medicaid program alone spent more than half a billion dollars to address asthma-related illnesses (DiNapoli 2014). As data are collected from early pilot programs to demonstrate and document the value of in-home prevention programs, the case for diverting significant funds toward prevention may become increasingly clear.

[7] Medicaid spending in FY18 was $593 billion (Rudowitz et al. 2019); 1% of this amount is $593 million.

Who Can Apply for Funds?

Each state has a department or office responsible for Medicaid. In some states, this office falls within a Department of Health and Social Services, Health and Human Services, or a similarly named agency. The state Medicaid/Medicare administrative agency can direct an MCO to act and files an SPA or 1115 Waiver. An MCO may have some discretionary options to provide preventive services. Depending on the mechanism used, funds may be available to program administrators, new health care service provider networks, and others.

How Much Funding Is available?

Medicaid spending was $593 billion in 2018, providing health care to more than 72 million people (Rudowitz et al. 2019). A significantly smaller amount of funding might be available for reimbursement for in-home programs, subject to the limitations of each of the available funding mechanisms. For example, a recent change in Indiana's reimbursement schedule has unlocked reimbursement for in-home asthma education potentially worth up to $12 million to in-state providers.[8] Potential funding of new preventive services is very large and could cover a broader array of in-home interventions.

How Can Funds Be Used? [9]

Because the mechanisms for employing Medicaid funding are broad, a wide variety of services or program elements could become eligible for reimbursement, either directly or as part of funding demonstration programs. SPAs, for example, are generally permanent whereas Section 1115 Waivers are typically approved for five years, with an opportunity for three- to five-year extensions (CMS 2020c, 2020a). For this reason—and because of its stated purpose of demonstrating new approaches—a pilot program's best option might be an 1115 Waiver.

How Are Funds Unlocked?

State coordination is necessary to utilize any of these funding mechanisms to support new health programs or services.

MCO CONTRACTS

As of July 2019, 40 states utilized MCOs to deliver care to their Medicaid populations. State-specific rules may govern when such contracts can be added, renewed, or amended to add

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[8] Based on a $9.70 per hour reimbursement of community health worker in-home education and management visits for one patient, subject to a 12-hours-per-month maximum cap per patient (IHCP 2018). The asthmatic adult and child populations of Indianans enrolled in Medicaid as of November 2019 were estimated using national asthma incidences of 7.7% for adults and 7.5% for children (CDC 2019b).

[9] A more detailed discussion of these structures is provided at nchh.org/resource-library/calc_pathways-to-medicaid-reimbursement-for-pediatric-asthma-services.pdf.

new services or change financing models of delivered care. Contacting a state representative to discuss your state's specific practices may provide the best starting point for understanding your state's unique limitations or procedures. Several groups offer resources about this process; we list them in the "More Information" section below.

1115 WAIVER

States can seek an 1115 Waiver through a structured application process that includes developing a proposal describing the need for a proposed program, along with its goals and structure. The CMS guidance website offers a detailed list of the application's required elements for states hoping to apply for 1115 Waivers; the website also includes several templates for both those developing an application and those applying to extend existing waivers. The CMS resources are at www.medicaid.gov/medicaid/section-1115-demonstrations/1115-application-process/index.html.

STATE PLAN AMENDMENT

To alter its Medicaid plan, a state must apply to amend it through a formal application process. This involves CMS reviewing the proposed changes to ensure that federal obligations for state spending are still being met. The requirements may vary depending on whether the amendment involves changes in reimbursement practices or development of a new state program. CMS's technical guidance and toolkits on navigating this process—including special guidance specific to SPAs related to home- and community-based services—are available at www.medicaid.gov/resources-for-states/spa-and-1915-waiver-processing/medicaid-spa-processing-tools-for-states/index.html.

More Information

The CMS headquarters offers technical assistance and information about program funding and grants; it also fields questions about applying these mechanisms. Phone and email contact information for the national and regional offices are available at www.medicaid.gov/about-us/contact-us/index.html.

State-specific CMS office links are available at www.medicaid.gov/about-us/contact-us/contact-state-page.html.

The National Center for Healthy Housing's *Pathways to Medicaid Reimbursement* offers detailed descriptions of the Medicaid structures we have described, along with several others of potential interest to the healthy homes community, at: nchh.org/resource-library/calc_pathways-to-medicaid-reimbursement-for-p.ediatric-asthma-services.pdf.

The Green and Healthy Homes Initiative's *Toolkit to Fund Lead Poisoning Prevention* offers additional guidance and information on pursuing Medicaid funding for healthy housing improvements focused on lead mitigation at www.greenandhealthyhomes.org/ghhi-toolkits.

STATE CHILDREN'S HEALTH INSURANCE PROGRAM (CHIP) HEALTH SERVICES INITIATIVE (HSI)

Examples of How These Funds Have Been Used

Maryland: Healthy Homes HSI with Lead and In-Home Environmental Assessment

Maryland funded a two-part program, structured as an HSI, that focused on assessment and remediation of health-impacting conditions in the built environment. The program's first part involves testing for, and direct remediation of, lead exposure hazards in the home. The second part includes both repeated asthma management education and a broader assessment of potential environmental hazards in the home. Hazards assessed include second-hand smoke and other indoor air quality issues, pest infestations, peeling paint, and improper pesticide use (MACPAC 2019a; CMS 2017a).

Michigan: Lead HSI with In-Home Environmental Assessment

As part of the response to the Flint lead crisis, Michigan developed an HSI directing $120 million over five years to environmental investigation and remediation of lead in the homes of children covered by CHIP. This included support for workforce training to ensure the technical capacity needed to conduct wide-scale lead removal and remediation, from in-home retrofitting and encapsulation to the removal of contaminated soil and materials (Mann, Serafi, and Traub. 2017; CMS 2018).

CHIP is a medical coverage program for children that states administer according to federal requirements. CHIP provides health care for children whose family income levels do not qualify them for Medicaid assistance, but who still struggle to pay for health care. Like Medicaid, funds from CHIP are administered by individual states according to a broader plan that defines eligibility of services and patient groups. CHIP is closely tied to Medicaid and Medicare, and within a state, these programs may share administrative infrastructure, depending on how a state's adoption of CHIP has unfolded (CMS 2020b).

A relatively underutilized (Sanchez et al. 2019) CHIP provision could unlock significant matching funds for in-home health interventions through the adoption of a Health Services Initiative (HSI).

The HSI mechanism gives states an opportunity to draw down federal matching funds for nontraditional, preventive medical service programs.[10] This mechanism allows for up to 10% of a state's total program spending, minus total program administrative costs, to be used for innovative or nontraditional care programs, potentially including in-home programs. Thus, if states can find a relatively small pool of state dollars to support an HSI, they can draw down federal funds at the CHIP matching rate as long as the cost of the whole HSI program fits within the remainder of this 10% administrative-plus-HSI cap. The matching rate of federal dollars to state dollars varies by state, but has historically been above 50%, and in some cases and funding years has significantly exceeded 80% (MACPAC 2020).

Although the potential funding varies widely by state based on population, administrative costs, and whether or not a state has already developed one or more HSIs, in most cases the funding is in the range of millions or tens of millions of dollars. As of FY2018, the potential

[10] Social Security Act Sec. 2105. [42 U.S.C. 1397ee].

funds available for HSIs totaled more than $900 million across all states and territories (see table 4).

So far, only 24 states have utilized this provision and begun tapping into these matching funds, which can be unlocked by filing an SPA (MACPAC 2019a). As with Medicaid funding types, CHIP might reimburse home energy efficiency programs for services.

Who Can Apply for Funds?

A state's CHIP administrator must apply, and individual program implementers interested in supporting and implementing an HSI may be involved in the process. Some states have partnered directly with small community program providers to develop a program and anticipated budget for this amendment process.

How Much Funding Is Available?

Potential HSI funding is capped at 10% of the state's total CHIP spending, minus the state's administrative costs. For example, a state that spends $100 million on health services through CHIP, with only $3 million in administrative costs, would be allowed to spend up to $7 million for HSI programs (10% * 100 = 10; 10 – 3 = 7). This $7 million would be split between the state and federal matching funds in the same ratio that applies for other CHIP spending. While the state's share of this spending must not be drawn from other federal pools of funding, this mechanism still allows for a drawdown of significant federal funds to match a relatively small investment on the state's part.

The funding available for HSIs thus varies by state, as well as by year (given that annual variation in administrative costs directly impacts available funding). Table 5 shows examples of the budgets for California, Wyoming, and the United States overall.

Table 5. Example estimates of potentially allowable spending for HSIs (in millions of dollars)

State	Total federal CHIP funds	Administrative costs	Potential HSI funds
California (largest pop.)	$3,263.30	$53.30	$273.00
Wyoming (smallest pop.)	$14.40	$0.70	$0.8
U.S. total	$17,297.40	$773.30	$956.40

Based on FY18 spending drawn from MACPAC 2019b

CHIP's future funding availability depends on state budgets, CHIP spending, and administrative costs, as described in the above formula. In early 2018, Congressional authorization of CHIP funding through 2027 clarified and stabilized near-future funding expectations, though future Congressional action could change this (AAP 2019).

How Can Funds Be Used?

HSIs can be used to fund a wide range of programs aimed at disease prevention and intervention beyond what normal health care settings can provide. Although the programs can address a variety of specific topics or health issues and offer flexibility regarding who can receive services, they must at least partially serve low-income children. States including Michigan, Maryland, and Arkansas have used an HSI to support programs related to in-home health services such as lead remediation (MACPAC 2019a). Federal guidance on HSIs lists a variety of in-home, preventive services that can be funded and encourages states to propose new programs that will improve the health of low-income children (CMS 2017b).

Existing CHIP HSI programs such as those in Maryland and Michigan currently support in-home assessments of environmental health concerns, as well as some types of work to improve the physical environment (especially lead remediation). Maryland's programs include an *environmental case management* element that involves service coordination and relationship management under this funding. These programs and others have supported patient education components such as asthma mitigation, as well as educational services in the form of workforce training (see example below).

How Are Funds Unlocked?

To access these funds, a state must create a viable program plan and budget for the intervention and identify sources of nonfederal funding that could match HSI money. An SPA process must then be initiated to include the new program in the state's CHIP plan.

A CHIP SPA must include a description of the proposed service type and how it will enhance children's health, including the proportion of low-income children served. States must also submit updated budget information for the proposed program (CMS 2017b). States can work together with particular program implementers to develop these budget estimates and the broader SPA application..

More Information

Detailed CMS guidance on developing and submitting an SPA is available at www.medicaid.gov/state-resource-center/spa-and-1915-waiver-processing/chip-spa-toolkit/index.html.

At the state level, CHIP is typically administered by the same office that administers Medicaid and Medicare; state points of contact for these CMS programs are available at www.medicaid.gov/about-us/contact-us/contact-state-page.html.

General questions about CHIP can be referred to the Medicaid mailbox at Medicaid.gov@cms.hhs.gov or by calling 877-267-2323.

Manatt Health HSI guidance documentation (with a lead prevention focus) is available at www.shvs.org/wp-content/uploads/2017/01/SHVS-Manatt-Leveraging-CHIP-to-Protect-Low-Income-Children-from-Lead-January-2017.pdf.

PREVENTIVE HEALTH AND HEALTH SERVICES BLOCK GRANT (PHHSBG)

A PHHSBG is issued annually to each U.S. state, as well as to Washington, DC, some U.S. territories, and two Native American tribes (hereafter, indicated by the umbrella term *state* for simplicity's sake). This grant program was established in 1982 to combine various smaller grant programs funding preventive care and other health-related services into a single program. The PHHSBG specifically targets areas of health and prevention that currently lack funding in a given state, or for which specifically allocated federal funding is deemed insufficient (CDC 2011).

The PHHSBG funds must be used to meet one or more of the objectives listed in the *Healthy People 2020* (HP2020) planning document (CDC 2020a).[12] These objectives are broadly defined and include measures that promote preventive health care and protect health through social determinants such as the built environment and related in-home and community-based interventions. Given this, programs offering weatherization and energy efficiency measures that focus on improving health through complementary means may be able to build a case that their state should fund such services through the PHHSBG. Funding levels vary by state and are directed at the state level through the responsible state health agency.

Examples of How These Funds Have Been Used

While we were unable to find previous examples of direct use of PHHSBG funds to support energy efficiency or related in-home health work, other types of successfully funded projects demonstrate the potential flexibility of these funds. We present two program examples below, along with their potential relevance to in-home energy and health program providers.

Rhode Island

In 2011, a nonprofit called *Progreso Latino*[11] applied for funding from Rhode Island's PHHSBG to support its comprehensive targeted health care outreach in the city of Central Falls. The funds were used to expand operating hours of a wellness clinic geared toward residents who either lacked insurance or who had work schedules that limited their ability to seek care during normal medical office hours. The funds also enabled the organization to offer health literacy education, including health fairs and nutritional counseling tailored to the needs of its service group, many of whom are Spanish speakers and immigrants who face other barriers to accessing care (CDC 2011). This example demonstrates the potential for using PHHSBG funds to support targeted programming and education focused on meeting the needs of an underserved community, as well as to expand the reach and scope of an existing community-based program with a demonstrated ability to serve those needs.

Texas EMS/Trauma Registry Program Evaluation and Update

The state of Texas used PHHSBG funds for a data collection program used to measure trends related to accidents and emergency medical services. The funds not only supported an evaluation of the existing system, but also supported the collection of user feedback on which updates would be valuable and a survey of best practices from other states. The analysis conducted using these funds leveraged new funding from another state agency to implement the recommendations (CDC 2011). This example demonstrates the potential of PHHSBG funds to support broader health-related program evaluation efforts, which might be of interest to local or state-level program providers hoping to document the health impacts of their work.

[11] progresolatino.org.

[12] See ODHP 2020 for the full list of these objectives.

Procedures for accessing funds from these grants or developing relationships to gain support from funded agencies vary by state, with total funds annually in the range of $147 million across all states and territorial entities (CDC 2019e).

Who Can Apply for Funds?

Funds are allocated annually to each of the 50 states, Washington, DC, 8 U.S. territories, and 2 federally recognized Native American tribes, each of which allocates its received funds to programs or initiatives of its choosing; the processes and priorities are flexible.

How Much Funding Is Available?

In FY2019, more than $147 million was disbursed to recipient states. Each state receives a different annual funding amount, ranging from tens of thousands of dollars (in the case of certain Native American tribes and freely associated island states such as the Republic of Palau) to more than $10 million (in the case of New York or California).[13] Each state allocates PHHSBG funding to a unique mix of programs and initiatives according to its needs and priorities. Statistics on overall national program allocations are reported on the grant website.[14]

How Can Funds Be Used?

States have wide latitude to determine how PHHSBG funds are allocated, but currently funded activities must be aligned with one or more of the objectives listed in the HP2020 guide published by HHS's Office of Disease Prevention and Health Promotion (CDC 2020a). These objectives include focusing on a broad array of social determinants of health. Certain themes and specific objectives listed in the HP2020 guide may help providers of in-home programs focused on health and energy efficiency build the case that their work aligns with the HP2020 framework. These themes include targets within several categories, including "homes and communities" (indoor air pollution, inadequate heating and sanitation, structural problems, electrical and fire hazards, and lead-based paint hazards); "social determinants of health" (including economic stability and the built environment); "chronic disease management" (e.g., for asthma); and "in-community injury prevention."

As the CDC notes, PHHSBG funds can be used to develop critical health sector infrastructure, as well as to fund innovative evidence-based approaches to care (CDC 2018b). They can also be used to establish systems—such as data surveillance and program evaluation—that can be valuable to programs seeking to document their work's health

[13] A complete table of funding by recipient is available at www.cdc.gov/phhsblockgrant/allocation/index.htm.

[14] See the PHHSBG website at www.cdc.gov/phhsblockgrant/funding/index.htm.

outcomes. In some cases, PHHSBG funds have been used to establish or strengthen programs that are later funded entirely through other sources.

How Are Funds Unlocked?

Because these grants are administered through the states and likely cover a wide range of initiatives and health spending priorities, fund availability for any particular new initiative may vary dramatically by state. Program administrators need to reach out directly to the block grant coordinator in their state to get a sense of how their initiatives or pilot ideas would mesh with state-level goals, as well as to understand funding availability and the application processes and timelines.

More Information

The CDC's Public Health Professionals Gateway: PHHS Block Grant website is at www.cdc.gov/phhsblockgrant/index.htm.

The CDC lists contact information for the PHHSBG coordinator for each state, territory, tribe, and district receiving funding at www.cdc.gov/phhsblockgrant/phhscontacts.htm.

SOCIAL IMPACT PARTNERSHIPS PAY-FOR-RESULTS ACT (SIPPRA)

A New Opportunity

This is a new program, so no prior examples of funding use are available. Funds were expected to be awarded in November 2019 for the first time; per published meeting minutes, the SIPPRA Commission made a list of awardee recommendations in October 2019, but final award decisions have not been publicly announced as of this writing.

SIPPRA is a new program intended to fund state and local government projects or pilots with positive social impact on the condition that they achieve a set of measurable positive outcomes. SIPPRA is intended to support the expansion of social services by state and local governments and to reduce the need for federal spending in related areas. Specifically, these "pay for results" programs must show they can reduce federal government expenses by providing measurable positive impacts to health or other elements of social well-being. The 2018 bill creating this program[15] allows for the disbursement of $100 million over a maximum of 10 years. Thus far, one round of applications has been submitted. In October 2019, a committee within the responsible Treasury Department office began assessing those applicants and had yet to announce the first round of recipients as of June 2020. Depending on the number of awards and the amount ultimately awarded per recipient, additional rounds of funding may be offered through this program in the coming years. At least one upcoming round of funding for feasibility studies is expected, based on the Treasury's original communications about the program (Department of the Treasury 2019).

Who Can Apply for Funding?

State and local governments and agencies are eligible to apply for funds to initiate or assess the feasibility of new pay-for-results programs. This includes—under the umbrella term of *state*—all 50 states, DC, commonwealths, U.S. territories, and federally recognized Native American tribes, while *local government* includes a county, borough, municipality, city, town, or local public authority, including any public housing agency, school district, or council of governments.[16] Although a single department within these government bodies must be designated as the "lead applicant," an application can be a joint effort among several departments or agencies.

How Much Funding Is Available?

A first notice of funding opportunity (NOFO) was issued in Spring 2019 (Department of the Treasury 2019). This NOFO, which ended in May 2019, was expected to award at most $66.3 million of the designated funding. A second NOFO for $10 million, intended as 50% matching funds for feasibility studies of future projects falling within the SIPPRA guidelines, is scheduled to be issued sometime in 2020. Additional funding opportunities may be issued depending on the funds remaining after these two grant cycles are complete.

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[15] 42 U.S.C. §§ 1397n-1397n-1397n-13. For a summary of the act, see home.treasury.gov/services/social-impact-partnerships/sippra-pay-for-results.

[16] The list of units included in this statute is available at www.law.cornell.edu/cfr/text/2/200.64.

As part of the "pay for results" nature of these programs, outcomes of recipient projects must be documented and assessed by an independent evaluator. Payment for these evaluations, as agreed upon before the start of the project by recipients and Treasury representatives, will be disbursed regardless of whether the program goals are met to avoid incentivizing lenient evaluations. But the remainder of the grant—the actual payment for program outcomes—may not be disbursed if the anticipated outcomes are not achieved. Applicants may partner with other organizations or firms to implement or mediate the programs, but such relationships must be documented in the application process rather than initiated after receiving approval.

How Can Funds Be Used?

Funding is open to social services programs that are run or coordinated by state or local governments, but the programs must be structured as pay-for-results projects (or, in the case of the upcoming NOFO, feasibility studies related to such projects). Furthermore, the programs must address (through "measurable, clearly defined outcomes") one of a list of goals enumerated in 42 U.S. Code § 1397n–1(b), which are designed to both support a social good and save the federal government money by addressing a social issue in an innovative and/or preventive way. Of these goals, the following may be of particular interest to groups working at the intersection of health, housing, and energy use:

> *(7) Improving birth outcomes and early childhood health and development among low-income families and individuals. ...*
>
> *(8) Reducing rates of asthma, diabetes, or other preventable diseases among low-income families and individuals to reduce the utilization of emergency and other high-cost care. ...*
>
> *(19) Increasing the financial stability of low-income families. ...*
>
> *(21) Other measurable outcomes defined by the State or local government that result in positive social outcomes and Federal savings.*

While the Department of the Treasury is still releasing new information on the likely scope and parameters of the upcoming NOFO, recent updates have reiterated that the next SIPPRA funding round will target feasibility studies for future social impact partnership projects. These grants will be structured as matching programs of up to 50% of total project costs. Additional details may be published once the NOFO is released. However, based on what is currently known, it appears that all elements of a typical program might be eligible for support, with a required emphasis on program impact assessment to prove that program targets have been met.

How Are Funds Unlocked?

A NOFO was posted in February 2019 through grants.gov with detailed application instructions; when a future opportunity is opened, the process will likely be similar (Department of the Treasury 2019). Applicants for the 2019 NOFO completed an application packet describing intended partnerships with program managers and implementers, and the financial arrangements and understandings among them (including in the case of unsuccessful implementation, which would preclude payout of the grant funds). Interested parties can sign up for email notifications about future SIPPRA grant opportunities at public.govdelivery.com/accounts/USTREAS/subscriber/new?topic_id=USTREAS_1114.

More Information

The primary contact address for this program is SIPPRA@treasury.gov.

Email signup for updates on future funding opportunities is available at public.govdelivery.com/accounts/USTREAS/subscriber/new?topic_id=USTREAS_1114.

The text of the SIPPRA legislation, which is a part of the Social Security Act, can be found at home.treasury.gov/services/social-impact-partnerships/sippra-pay-for-results/sippra-legislation.

The first NOFO (as published in the Federal Register) is available at www.federalregister.gov/documents/2019/02/21/2019-02852/social-impact-partnerships-to-pay-for-results-act-demonstration-projects.

The SIPPRA FAQ, which is periodically updated with new information, is available at home.treasury.gov/services/social-impact-partnerships/sippra-pay-for-results/sippra-frequently-asked-questions.

The SIPPRA website, which contains an overview description, is home.treasury.gov/services/social-impact-partnerships/sippra-pay-for-results.

LEAD HAZARD CONTROL GRANTS WITH HEALTHY HOMES SUPPLEMENTAL FUNDING

Examples of How These Funds Have Been Used

HUD actively encourages the use of funds from this grant for braiding and blending with other related healthy homes programs and services; the 2019 Notice of Fund Availability (NOFA) even explicitly encourages "work to further collaboration and coordination with public private partnerships" such as weatherization programs. Examples of the use of these grants under their current structure and name are limited, as this change was relatively recent; following are examples of the use of these grants in previous forms.

GHHI Rhode Island

In Rhode Island—as in other areas—the Green and Healthy Homes Initiative (GHHI) has developed a set of partnerships that enable the use of lead grants from OLHCHH in coordination with a broad range of healthy homes service providers and funding sources. These include WAP-funded weatherization agencies and various sources of community development funding that help reduce program deferrals by filling the financial gaps that would otherwise prevent expensive repairs in homes that need the most work. This program includes partnerships with academic institutions to document health and educational outcomes for participants; the broader initiative and partnerships have also included supportive policy work, including a focus on relevant building code enforcement and advancing state-level lead legislation (GHHI 2020b.

Community Action Agency (CAA) in Bellingham, Washington

Under the previous OLHCHH structure, funds from this office were used to support programming in Bellingham through the local CAA, which operated both the local WAP program and a Head Start preschool initiative. Asthma services such as family education and mitigation supplies were incorporated into the CAA's work, and training was conducted for involved staff across disciplines (weatherization, social work, etc.) (OLHCHH 2012). While the Healthy Homes Demonstration Grant itself no longer exists, Healthy Homes Supplemental (HHSupp) funding might be used to complete similar work today, assuming a lead control grant had also been received.

HUD runs two related lead hazard control grant programs out of its OLHCHH: Lead Hazard Reduction (LHR) and Lead-Based Paint Hazard Control (LBPHC). Both of these grant programs are intended to help local and state governments reduce lead exposure in children through in-home remediation of lead-based paint and other exposure hazards; funding for both programs can be accessed under the same application process, though their eligibility and program requirements vary.

Recipients of funds through these grants—which require that the applicant match at least 10% of requested funds from nonfederal sources—can also request additional HHSupp funds. These additional funds can be used to assess and remediate a range of other in-home hazards noted under the Healthy Home Rating system, including hazards that are either partly addressed by weatherization measures directly (such as moisture intrusion and thermal stress risk) or that complement weatherization work (such as trip-and-fall prevention).

Prior to 2017, HUD operated two related grant programs: the LHR Demonstration Grant, and the Healthy Homes Demonstration Grant. In recent years, these programs have been restructured and the total funding for related lead and healthy homes interventions under these new structures has significantly increased since 2017.

Who Can Apply for Funds?

A state or local government unit or agency must be the lead applicant; nonprofits or independent organizations cannot apply directly, though funds may be distributed as subawards to entities other than the direct contractors. Previous recipients of these grants or of the LHR Demonstration Grant may apply again once their funding period has expired.

How Much Funding Is Available?

Up to $324 million was made available under the 2019 application cycle, with up to $38 million available as HHSupp funding. This amount was an increase from the 2018 cycle, in which awards totaled $319 million. As of 2019, individual awards range from $1 million and up to $9.1 million for jurisdictions categorized as *high-impact neighborhoods*. The duration of these grants is five years or less.

HHSupp funding is awarded to lead fund recipients and is based on categories of neighborhood need; up to $600,000 is available to applicants in high-impact areas, while new applicants or applicants who received funds two or more years prior can access up to $300,000. Home hazard work in individual residences that is expected to cost more than $5,000 must be reviewed on a per-unit basis by a HUD technical representative for approval.

How Can Funds Be Used?

Lead hazard control funds must be used to address lead hazards in privately owned residences or housing units, with the ultimate goal of reducing lead exposure in children six and under (for example, by renting to families with young children following remediations). Programs can also provide lead safety and related education to occupants of served homes.

While HHSupp funding is not required to be used in every home receiving lead remediation, a complete Healthy Homes Assessment is required in all homes where the funding *is* used. This assessment must cover a list of in-home hazards determined in advance by the applicant as part of a submitted work plan. The assessment results must be reported to the resident and/or homeowner, with recommendations on how any observed hazards could be remediated (whether through HHSupp funded means or through other available community resources or programs if HHSupp work will not continue for any reason).

While a full list of hazards must be assessed in each home, full remediation of each identified hazard is not required; cost effectiveness and budget are explicitly noted in federal program guidance as key factors in deciding which elements to address. A clear method for prioritizing which hazards to address must be developed as part of the initial grant application. As we noted above, using more than $5,000 in HHSupp funds in a single home requires HUD approval

How Are Funds Unlocked?

A local or state government entity must apply for the funds, but the money may be distributed as subawards to other entities to help manage funds and program infrastructure. A notification of funding availability is published once per year, and the program is open to new and previous applicants. HHSupp funds are requested as part of the lead control grant application.

More Information

More information about the lead grants and HHSupp funding is available from the regional officers of the OLHCHH Grants Division. A list of key program officers' contact information, sorted by region, is available for download on the OLHCHH Grant Division's website: www.hud.gov/program_offices/healthy_homes/GrantServices.

The 2019 NOFA details specific jurisdictional categories that impact available funding under each arm of the lead control programs. The document is available at www.hud.gov/sites/dfiles/SPM/documents/FY19_LeadHazardReductionGrantProgram.pdf.

Questions regarding specific program requirements should be directed to Yolanda Brown at Yolanda.A.Brown@hud.gov.

Additional information on applying for lead control grants and HHSupp funding is available as part of GHHI's Lead Funding Toolkit, but some of the details of fund availability and eligibility have changed in the 2019 NOFA. The relevant profile is available at www.greenandhealthyhomes.org/toolkit_resource/hud-office-of-lead-hazard-control-and-healthy-homes-grant-programs.

We also recommend reaching out to GHHI directly for more information and guidance on developing partnerships through these lead control grants, as this has been central to their work model in a number of regions. Regional office locations and a contact form are available at www.greenandhealthyhomes.org/contact-us.

NATIONAL ASTHMA CONTROL PROGRAM (NACP)

Examples of How These Funds Have Been Used

Montana

Montana's Department of Public Health and Human Services coordinates state-wide asthma work using NACP funds through the Montana Asthma Control Program (MACP). In 2010, the MACP initiated the Montana Asthma Home Visiting Program (MAP), a holistic in-home program. MAP involves regular home visits by a nurse over the course of a year, with advice and education on a variety of asthma-related topics and interventions. Following an evaluation of the program's pilot versions in 2015, nurses were given a list of service providers and programs to refer patients to, including weatherization programs providing assistance both nationally and locally. This case demonstrates that the public health infrastructures supported by NACP funding can be used to increase health provider awareness of and referrals to existing programs, potentially opening the door for other types of future partnership as funding becomes available (Montana DPHHS 2020).

Minnesota

The 2014–2020 Minnesota state asthma plan includes several objectives relevant to energy efficiency program providers (Minnesota Department of Health 2014). This includes a stated strategy of "increas[ing] reimbursement for multi-trigger, multi-component asthma-trigger interventions offered by qualified professionals."

The Minnesota Department of Health's asthma resource website[17] also directs users to the Sustainable Resources Center, Inc., a nonprofit that provides healthy housing services, including free energy efficiency upgrades to qualifying homes.

For the past two decades, the CDC has provided NACP funding to select state health departments and other large agencies and organizations to support the control of asthma (CDC 2019d). This funding takes the form of partnerships and multiyear funding awarded through a competitive grant process, which depends on the state having a demonstrated history of surveillance of asthma records and other engagement on the issue.

NACP partnerships provide support for state-level program infrastructure related to monitoring and reducing asthma within the state's jurisdiction. States may opt to distribute funds to organizations performing in-home remediations that could reduce occupant asthma symptoms. The NACP model is flexible, and funding access largely depends on the state agency responsible for administering and participating in the program. States are allotted no more than $800,000 per year under the terms of the most recent grant cycle (CDC 2019d).

Individual programs providing services cannot access funds from these grants directly. However, the grants mandate the formation of statewide coalitions that may permit direct reimbursement for services or indirect reimbursement through long-term agency partnerships and technical support. While few energy efficiency programs have played a strong role in NACP-funded state coalitions to date, the CDC's technical guidance explicitly identifies a need to incorporate weatherization services into holistic asthma management, and some states have already developed working partnerships with such programs. The increasing value placed on these new technical guidelines by the most recent NACP NOFO implies that grantees may be

[17] The Minnesota Department of Health's "Asthma and the Home Environment" is available at www.health.state.mn.us/diseases/asthma/homes/index.html.

seeking more partnerships with energy efficiency program providers in this and future grant cycles.

Who Can Apply for Funds?

NACP funding is intended to help large organizations such as state health departments and agencies coordinate asthma work across a designated region (almost always a state).[18] The NACP cooperative partnership grants are not designed for small organizations seeking to meet only one part of the CDC's technical requirements; rather, the grants are intended to catalyze and support coalitions of many smaller regional partners, coordinated or organized by a large grant recipient that has significant existing public health infrastructure.[19]

States typically receive multiyear grants; as of 2019, the CDC was funding health departments in California, Connecticut, Florida, Georgia, Hawaii, Illinois, Indiana, Maine, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, New Hampshire, New Mexico, New York, Ohio, Oregon, Pennsylvania, Puerto Rico, Rhode Island, Utah, Vermont, and Wisconsin.

Smaller programs interested in coalition building and potential funding opportunities stemming from NACP cooperative grants must directly contact their state's program coordinator and discuss possible pathways to partnership. A list of primary contacts for each CDC partner state (and other states with major asthma-related initiatives) is available at www.cdc.gov/asthma/contacts/default.htm.

How Much Funding Is Available?

Congress controls NACP's overall funding. Up to $70 million was available for the 2019 grant cycle, with annual awards to individual states capped at $800,000. Funding varies significantly by state and is scaled by population. For example, states with 100,000–399,999 people have annual awards set at $300,000, while those with populations of more than 25 million are eligible for up to $800,000 per year. Funding amounts scale within these two endpoints based on population brackets.

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[18] In some instances, the CDC has funded asthma control projects by school districts and national NGOs through other short-term agreements, but this is atypical and not the intent of the NACP coordination grants (D. Burrows, pers. comm., 2019).

[19] For example, the Spring 2019 NACP funding opportunity was open to organizations that could demonstrate a history of successful service to more than 100,000 people, as well as several other requirements that indicate significant past involvement in asthma control work published within the four years *prior* to the opening of the NOFO (indicating that a group must have been previously working to establish this significant evidence base prior to the funding opportunity's announcement).

Table 5. Approximate five-year and annual funding for NACP asthma coordination[20]

Approximate funding over five years	Approximate funding per fiscal year
Program total	
$70,000,000	$15,000,000
Anticipated average award	
$2,500,000	$500,000 ($300,00–800,000)

How Can Funds Be Used?

The latest grant guidance allows funds to be used for in-home interventions including weatherization and building upgrades, insofar as these upgrades fit into the new EXHALE technical scheme to address asthma holistically (CDC 2019d). Generally, grantees should use NACP funds to support partnerships and services that provide "asthma management education, home visits to implement asthma-trigger reduction, [and/or] coordination of care across settings" (Hsu et al. 2018).

Grants can be used to support a program to reduce asthma triggers from indoor and outdoor sources, consistent with the CDC's six-prong EXHALE technical strategy.[21] The *EXHALE* acronym refers to various elements of a holistic framework for addressing and reducing asthma risks. This framework includes provisions for using grant funds to facilitate home energy efficiency, including home WAPs for low-income groups. The most recent NOFO includes a wide range of specific guidance for incorporating environmental health into asthma response plans (*environmental health* provides the final "E" in EXHALE). While many elements of environmental health and social determinants of health are discussed in the technical documentation, the framework explicitly states that strategies pursued by NACP programs should "adopt environmental policies or best practices to reduce indoor and outdoor asthma triggers," including through means such as "collaborat[ing] with partners that encourage home energy efficiency, including home weatherization assistance programs for low-income families." The framework notes that "structural improvements made by these programs may complement home visiting programs for asthma." Explicitly highlighting energy efficiency and weatherization

[20] Derived from the March 2019 NOFO (www.grants.gov/custom/viewOppDetails.jsp?oppId=314360) related documents tab: CDC-RFA-EH19-1902.pdf, pp. 14 and 26.

[21] J. Hsu, K. Sircar, E. Herman, and P. Garbe, *EXHALE: A Technical Package to Control Asthma* (Atlanta, GA: National Center for Environmental Health, Centers for Disease Control and Prevention, 2018). Accessed February 2020. www.cdc.gov/asthma/pdfs/EXHALE_technical_package-508.pdf.

programs provides potential justification for these programs seeking to partner with state-level NACP coordinators.

NACP guidance also specifically recommends (CDC 1997) the braiding of these grants with other types of funding and resources, including private foundation grants, state-based program funds, pharmaceutical company funds, membership dues, tobacco settlement money, maternal and child health grants, and even in-kind donations of services such as meeting spaces or printing. In some cases, the funding actually devoted by a state to partnerships with smaller organizations takes the form of supporting the administrative work required to manage those partnerships, rather than providing direct funding to the organizations themselves. However, states such as Minnesota include reimbursement for services from community organizations as an objective of their asthma control plans, explicitly highlighting a goal of increasing funding for such reimbursements in the future (Minnesota Department of Health 2014).

How Are Funds Unlocked?

For programs providing in-home services directly, there is no standardized national process for forming partnerships with NACP grantees. In states already funded by an NACP cooperative partnership grant, small groups hoping to access funds would need to form or join coalitions with the grant recipient (typically, the state health department or agency). This process, and its likelihood of success, may vary significantly by state; reaching out directly to a state NACP representative should be the first step to gauging the feasibility of joining an asthma control program coalition.

In states not currently receiving an NACP grant, local groups could initiate a conversation with the state health department about the potential for applying for this funding. An offer to help the agency with application elements—such as developing an asthma plan and/or identifying other potential members of a statewide asthma coalition—might get the ball rolling on development of a state asthma plan and preparation for a NACP application.

The main point person and contact information for each state and territory participating in a CDC partnership are listed at www.cdc.gov/asthma/contacts/default.htm. The list also includes states without a formal NACP partnership that are doing significant work on holistic asthma response; these states may be a good starting point for weatherization groups interested in learning more about other local sources of support.

More Information

State contacts for the 24 states and territories currently receiving NACP coordination grants are available at www.cdc.gov/asthma/contacts/default.htm.

The latest NOFA includes detailed information on eligibility and funding information and is available for download at www.hud.gov/program_offices/spm/gmomgmt/grantsinfo/fundingopps/fy19techstudies.

Recommendations

We encourage program administrators to consider the financial resources we highlight in this report in conjunction with other strategies for braiding funding to expand available resources for their programs and increase their impacts. In the following, we outline additional considerations that may help program administrators as they develop their strategy.

INCLUDE PROGRAM ELEMENTS TO ATTRACT HEALTH-FOCUSED FUNDING

Whether launching a new program or incorporating services into an existing one, including particular program elements can position programs for success when seeking funding.

Include Interventions That Maximize Health Impacts

Although many standard energy-saving interventions positively impact health, incorporating program design elements that maximize health benefits can better position programs to obtain health-focused funds. For example, air sealing and insulation (standard energy-saving measures) can reduce exposure to common asthma triggers such as pests and drafts. By incorporating a few additional services, such as in-home asthma-trigger education, identification, and mitigation, a program can more holistically address asthma triggers and will be better positioned to obtain asthma-based funding. Certain nonenergy measures—such as mitigation of trip-and-fall hazards; lead and radon remediation; improved ventilation; installation of radon, carbon monoxide, and smoke detectors; and combustion safety testing—can result in substantial public health gains given the individual and national cost of the mitigated health threats.[22]

Program administrators who consider their community's public health needs can maximize impacts by customizing programs to meet those needs. Does the program operate in an area where asthma, mold exposure, or lead prevalence is especially common? Is the program serving older adults or young children? Is a large portion of the population served by Medicare or a particular health care provider? Nonprofit hospitals are required to conduct a Community Health Needs Assessment that identifies many of these needs and opportunities to improve community health. These assessments can provide valuable information to program administrators and an opportunity to collaborate with local hospitals to address community needs.[23] Identifying the community's health needs and

[22] For more information on fall hazards, see ACEEE's recent report on valuing complementary in-home health measures (Hayes, Kubes, and Gerbode 2020). For more information on avoided deaths from smoke detectors, see Ahrens 2019. For more on radon, see National Cancer Institute (2011). An extensive set of publications on lead poisoning is available from the CDC (2020b). Learn about carbon monoxide threats in the home from CDC (2018a). The health impacts of gas stove use are reviewed in Seals and Krasner (2020).

[23] 26 USC § 501(r) 3. For more details, see www.irs.gov/charities-non-profits/community-health-needs-assessment-for-charitable-hospital-organizations-section-501r3. Community Health Needs Assessments are generally available on a hospital's webpages.

potential health care partners can help program administrators customize a strategy for bringing together financial resources to meet community needs.

Measure and Demonstrate Health Impacts and Outcomes

Measuring and documenting a program's health-related outcomes and participant impacts provides actionable data that program administrators can use to identify approaches that successfully meet a community's needs (Hayes and Denson 2019). Being able to demonstrate specific health outcomes can also position a program to leverage dollars earmarked for preventive approaches to health care, which helps make that program a priority when competing for limited funding.

Develop Strong Partnerships with Health Care Sector Professionals and Institutions

Establishing partnerships and working relationships with health sector experts, including local and state health departments, can make a profound difference in the success of health–energy collaborations. Health sector advocates can help energy partners navigate complex health systems and decisions; they can also champion programs within their institutions and networks. Local health groups bring investment in and knowledge of community health needs, which can help ensure that programs have maximum impact and are successfully meeting community needs.

Demonstrating a program's health outcomes can help to attract and build cross-sector partnerships. For example, utility-run programs might find supportive partners in the health care community if they can show clear evidence that they are achieving health benefits for participants. Other strategies for making and sustaining these important connections are described in VEIC's *Energy-Plus-Health Playbook*, which draws on program examples to formulate recommended practices.[24]

Quantify the Monetary Value of a Program's Health Impacts

Valuing the monetary health benefits of energy efficiency programs can help decision makers in the health sector to prioritize resources earmarked for preventive services. This could include complementary health and safety services beyond energy efficiency measures that also add value to interventions.[25] The monetization of health benefits can demonstrate—to hospitals, MCOs, public health departments, and insurers—that collaborative partnerships to deliver preventative services will generate positive results for participating households.

TARGET FUNDING SOURCES AIMED AT IMPROVING HEALTH AND SOCIAL WELFARE

A living environment can impact a variety of diseases and other health harms. The diverse range of potential benefits from in-home interventions means that a variety of potential funding sources may be available to mitigate these health harms. There is a growing body of

[24] For information on new and ongoing partnerships, as well as guidance and strategies for engaging across energy and health sectoral lines, see VEIC's *Energy-Plus-Health Playbook* (Levin, Curry, and Capps 2019).

[25] For more information on how to monetize the health benefits of in-home preventive interventions to protect health, see Hayes, Kubes, and Gerbode 2020.

compelling literature that connects in-home energy-saving programs to beneficial health outcomes. As the intersection of the built environment, health, and the efficacy of specific in-home interventions to mitigate health harms is increasingly understood, additional options to leverage funds aimed at improving health and social welfare may become clear. Indeed, as program administrators increasingly recognize the value and impact of using funding earmarked to protect health and social welfare to support energy-saving programs, they may find entirely new funding streams.

ADDRESS EQUITY

Some communities lack access to safe and healthy housing; they experience higher rates of preventable disease and injury, greater exposures to environmental harms, higher energy costs, and greater exposure to climate threats. Low-income and black families are significantly more likely to live in inadequate housing conditions than other groups,[26] and many of the chronic diseases exacerbated by poor housing conditions—including asthma, cardiovascular issues, and stroke—also disproportionately impact these same vulnerable populations.[27] Low-income groups are also more likely to struggle with energy costs (Drehobl and Ross 2016), compounding these existing inequities. High energy bills may force households already struggling financially to make choices between paying these bills and paying for other necessities like food and medication, which in turn further impacts health and well-being (Hernández 2016). These inequities have been highlighted during the COVID-19 crisis, as the virus disproportionally impacts lower-income families and communities of color. The pandemic has both highlighted the relationship between energy, health, housing, and economics and emphasized the need to address these burdens through an integrated approach that prioritizes equity and environmental justice.

Programs targeting groups that are more likely to face these compounding and overlapping challenges may have greater impact, making a bigger difference to the well-being of participating families. This focus may also help attract the support of health partners who recognize these greater needs in the communities they serve.

Energy-saving programs targeting low-income households are available, yet various factors can prevent families from participating. Upfront program costs—whether tangible financial costs in some non-WAP programs, or less tangible transactional costs related to time and coordination burdens—might make it difficult for some families to participate. Families renting their housing may face other challenges in accessing weatherization services. For example, nontenant landlords who do not pay a tenant family's energy bills may have few short-term incentives to make property improvements that will not impact the bottom-line

[26] U.S. Census data show that low-income households make up 56% of families living in inadequate housing conditions, despite making up only 37% of the respondent population, while black families are 60% more likely than white families to live in inadequate housing (Census Bureau 2020) as discussed in Hayes and Denson (2019). A discussion of the conditions that are considered in determining housing adequacy can be found at census.gov/content/dam/Census/programssurveys/ahs/publications/HousingAdequacy.pdf (Eggers and Moumen 2013).

[27] See work demonstrating disparate rates of disease impacts such as Brown 2012; Akinbami et al. 2012; Go et al. 2013; CDC 2016; Oates et al. 2017, as discussed in Hayes and Denson 2019.

costs of property ownership. A home's preexisting physical deficiencies may also prevent a family from participating in a program if that program is not designed to address the types of structural or other health and safety issues that can disqualify the home from receiving the offered services. Common bases for deferral include damage or degradation of roofing or other major home structures, significant mold or moisture problems, pest infestations, and electrical or sewage system issues (Wilson and Tohn 2011).

Programs aimed at improving buildings to reduce energy use are often not funded to mitigate these types of concerns; as a result, the programs are forced to defer weatherization services for those buildings. A National Renewable Energy Laboratory study found an average national deferral rate of 10–15%, with as many as 50% of homes unable to receive services in some service jurisdictions (Wilson and Tohn 2011). Some states have specific "pre-WAP" programs to help prepare houses that would otherwise have their WAP-funded weatherization deferred; however, the majority of states lack such a program (NASCSP 2017).

The same issues that can make families ineligible for the existing network of services—that is, inadequate housing and poverty—also contribute to a wide range of health harms. Households that may be considered "hard to reach" by energy-focused programs might be the priority demographic for health-focused funders. By designing programs to target these needs and fill service gaps, programs will be positioned to better meet the needs of health-focused partners and ultimately do more good overall.

LOOK FOR NEW OPPORTUNITIES

New funding opportunities and grant solicitations are announced frequently. In addition to new opportunities, established funding sources that may not currently fit may be modified in the future as they evolve.

The federal government website www.grant.gov consolidates federal grant opportunities. Interested parties can register to create a free account on this website, then subscribe to email notifications about new opportunities as they are posted. These notifications can be tailored with saved keyword searches—such as limiting notifications to new grants containing the word "asthma" in their description. Appendix A provides a walk-through of this process.

In addition to tracking grant opportunities, program administrators can also track federal stimulus funds, particularly in response to the COVID-19 pandemic, as these funds can be allocated to energy efficiency programs as well as specific health interventions. These funds can trickle down from the federal level to the state and local levels, as seen in programs such as LIHEAP and WAP.

This allocation of administrative responsibility from the federal level to states is also seen in other federal resources. Recent changes to Medicaid rules following the passage of the Affordable Care Act (ACA) have expanded funding for preventive services. Although these changes originated at the federal level, fund availability is contingent on state laws, which may also evolve to create new opportunities (e.g., IHCP 2018).

Conclusion

There is a strong link between health and the built environment, and there is a major need to provide services to address health threats in people's homes. The existing network of in-home energy efficiency programs can meet this need and deploy these services. By braiding funding from the health and energy sectors, we have an opportunity to both meet the critical needs of underserved populations and dramatically expand our ability to keep people safe from illness and harm, while also helping to make their homes safer and more efficient.

Identifying new partnership opportunities to leverage health sector funds and program infrastructure is a natural next step in expanding the reach of both energy efficiency and preventive in-home services at a moment when the value of both is increasingly clear. The COVID-19 crisis has tragically demonstrated the severe consequences of health inequities for overburdened populations. These are largely the same communities most likely to be impacted by waves of worsening threats as climate change unfolds. The importance of righting inequities to help put these communities on more resilient footing has never been clearer. In addition to the immediate benefits of serving particular communities, aggressive energy efficiency policies—including the acceleration of in-home retrofits from less than 1% per year to approximately 2% per year—could help move the United States halfway to its Paris Climate Agreement emissions commitments by 2050 (Ungar and Nadel 2019). In the wake of the ACA's 2010 passage, a new emphasis on preventive care is reshaping the medical sector (NPC 2012). Ambitious collaboration and sharing of program resources across the traditional boundaries of the energy efficiency and health care sectors could open the door to a new paradigm of customer protection, patient care, and climate action.

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Appendix A. Navigating Grants.Gov to Find New Opportunities

Once you have registered an account, click on the *Search Grants* tab (or click here) to create an email notification for a specific search (figure A1).

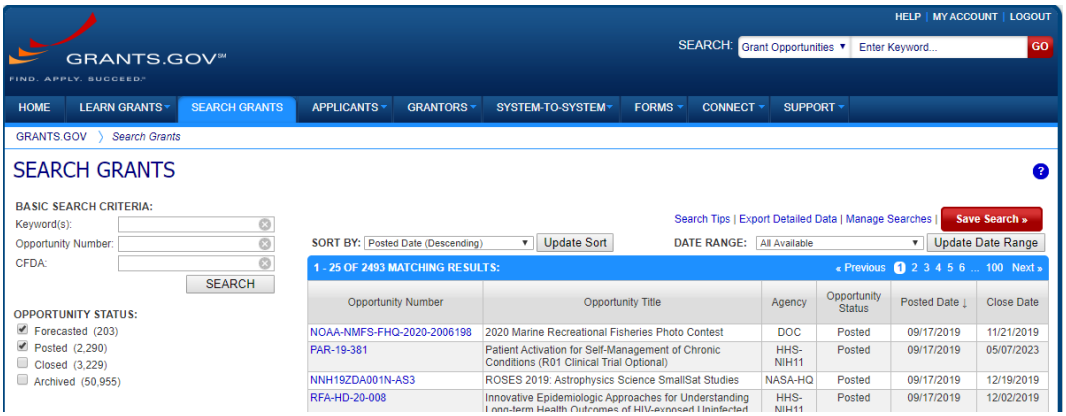

Figure A1. Grants.gov Search Grants page

You can then click the red *Save Search* button. This will take you to a page where you can customize a set of terms and filters for receiving notifications when new grant opportunities meet your terms. Figure A2 shows an example search setup using the keyword "asthma" to search for grants open to nonprofits focused on healthy housing.

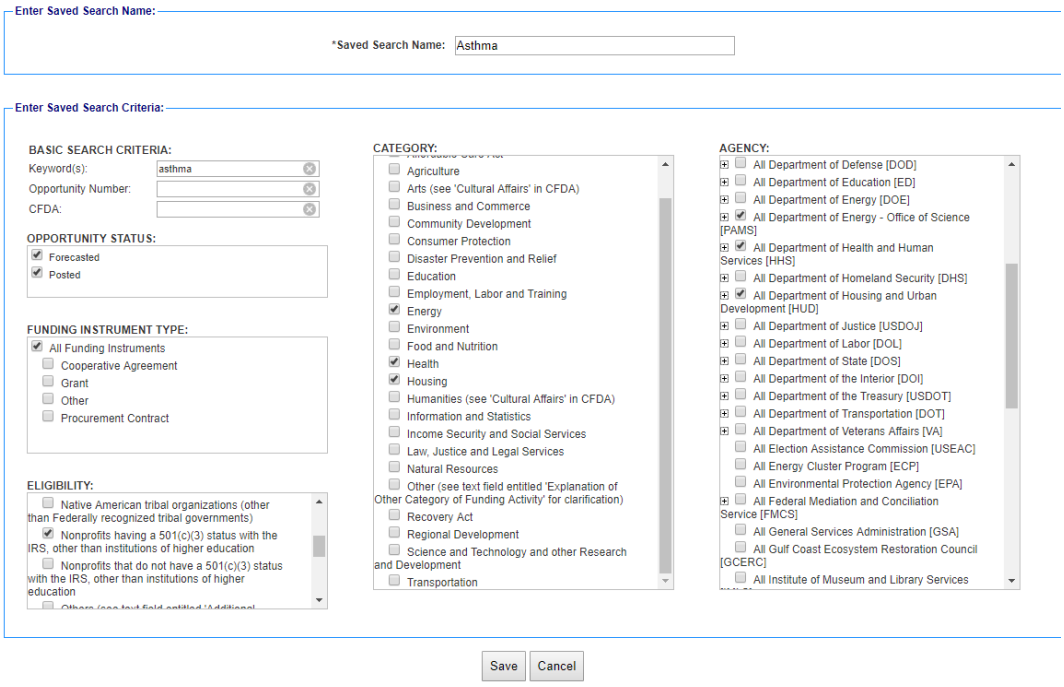

Figure A2. Asthma grants search setup

Clicking *Save* enables notifications to the email address you used to create your account. You can save up to 15 searches.

Appendix B. External Advisory Panel

Table B. Names and affiliations of external advisory panel

Name	Affiliation
Alyson Caiola	AVANGRID, Inc.
Nick Mark	Centerpoint Energy
Marion Lunn	ComEd
Julie Michals	E4TheFuture
Fred Gordon	Energy Trust of Oregon
Mark Wyman	Energy Trust of Oregon
Laura Rodormer	National Grid
Matthew Ray	National Grid
Scott Higa	Southern California Edison