



August 1, 2022

Office of General Counsel, Regulations Division  
Department of Housing and Urban Development  
451 7<sup>th</sup> St. SW  
Washington, D.C., 20410-0500

*Submitted Electronically*

**Re: Comments on NSPIRE and Associated Protocols**

To whom it may concern,

The Public Health Law Center (“PHLC” or “the Center”) is a law and policy organization working to advance equitable public health policies. For over 20 years, the Center has been working to regulate and phase out commercial tobacco products, improve access to healthy food, promote equitable transportation, and foster systemic change that combats the legacy of institutional racism in the United States. In keeping with these goals, the Center recently expanded its scope of work to include the pursuit of healthy housing, especially for the historically disenfranchised who are now most vulnerable to the devastating impacts of climate change.

With this perspective, PHLC—along with its co-signor Elevate—submits the following comments, which are presented in response to the questions HUD posed in the Federal Register on June 17, 2022,<sup>1</sup> pertaining to version 2.2 of NSPIRE and associated inspection standards. As currently

---

<sup>1</sup> See generally Request for Comments: National Standards for the Physical Inspection of Real Estate and Associated Protocols, 87 Fed. Reg. 36426 (June 17, 2022) (inviting public comments on the instant Notice of Proposed Rulemaking as well as version 2.2 of the NSPIRE standards themselves).

written, these standards are inadequate to protect residents of HUD-assisted housing from indoor air pollution, fire hazards, and other health and safety risks. The standards at issue must be made more protective of human health if HUD is to fulfill its mission of improving the lives of low- and moderate-income citizens by providing decent and safe dwellings.<sup>2</sup>

## **I. NSPIRE should include a deficiency related to mold risk.**

The Center supports HUD's proposal to take a precautionary approach towards mold by creating and enforcing an advisory mold risk deficiency with the help of both infrared and moisture detecting tools. Further, the Center recommends that, in light of this new advisory deficiency, the deficiency for mold-like substance at low levels be elevated to a standard deficiency that requires remediation within 30 days.

For residents of public housing and other low-income communities whose homes will be governed by NSPIRE, mold is a common nuisance.<sup>3</sup> Molds pose a health hazard because they produce airborne allergens and irritants.<sup>4</sup> While allergic reactions to mold often produce relatively mild symptoms like eye, skin, nose, and throat irritation, mold can also cause asthma attacks and more severe respiratory distress in vulnerable individuals.<sup>5</sup> HUD must base its decision pertaining to this particular deficiency on the more severe impacts of mold because members of the low-income, marginalized communities<sup>6</sup> that HUD programs largely serve are both more likely to have asthma and

---

<sup>2</sup> 42 U.S.C. §§ 1437(a)(1), 1437a(b)(1), 1437d(f); 24 C.F.R. § 5.703; *see also* 42 U.S.C. § 3531 (stating that HUD is to promote “sound development of the Nation’s communities and metropolitan areas”).

<sup>3</sup> Evan Lemire et al., *Unequal Housing Conditions and Code Enforcement Contribute to Asthma Disparities in Boston, Massachusetts*, 41 HEALTH AFFAIRS 563, 563-64, 570 (2022); Lili Pike, *In Public Housing, a Battle Against Mold and Rising Seas*, (March 25, 2020) <https://undark.org/2020/03/25/public-housing-mold-climate-change/>.

<sup>4</sup> *Mold and Health*, <https://www.epa.gov/mold/mold-and-health> (last visited July 19, 2022).

<sup>5</sup> *Id.*; *see also* *Mold*, <https://www.cdc.gov/mold/> (last visited July 19, 2022).

<sup>6</sup> Here, PHLC uses the term “marginalized” as an umbrella term to refer to various racial, ethnic, cultural, socioeconomic and geographic subgroups who have historically been and continue to be harmed by misguided and prejudicial national, state, and local policies. *See, e.g., Texas Dep’t of Housing & Community Affairs v. Inclusive Communities Project, Inc.*, 579 U.S. 519, 528-29 (2015) (describing government endorsed discriminatory housing practices such as redlining that led to inequalities that

more likely to experience barriers to accessing and affording asthma treatment.<sup>7</sup> Consequently, HUD-assisted tenants—and especially children—stand to reap the greatest benefits from asthma interventions like mold prevention and remediation.

Children are particularly vulnerable to the health impacts of air pollution because their respiratory systems are still developing.<sup>8</sup> This makes children more susceptible than adults to pollution-driven pulmonary diseases like asthma. In fact, asthma is one of the leading causes of school absences, and children from low-income, Black, and Hispanic families are more likely to miss school because of asthma.<sup>9</sup> Chronic school absences and irregular attendance prevent kids from reaching critical learning milestones and increase the odds that a child will not graduate from high school.<sup>10</sup> In turn, dropping out is correlated with diminished health, increased involvement in the criminal justice system, and a continuation of the vicious cycle of poverty.<sup>11</sup>

---

remain today). By using this term, PHLC does not mean to imply the treatment of any one subgroup has been comparable to the treatment of another. The Center recognizes that individual groups have suffered unique harms at the hands of the U.S. government, and where possible, Commenters have made efforts to name impacts that are specific to particular subgroups.

<sup>7</sup> DR. YIFANG ZHU ET AL., UCLA FIELDING SCHOOL OF PUBLIC HEALTH, EFFECTS OF RESIDENTIAL GAS APPLIANCES ON INDOOR AND OUTDOOR AIR QUALITY AND PUBLIC HEALTH IN CALIFORNIA 6-7 (2020), <https://ucla.app.box.com/s/xyzt8jc1ixnetiv0269qe704wu0ihif7>; Evan Lemire et al., *supra* n.3, at 563-64, 568; Sara B. Johnson et al., *Asthma and Attendance in Urban Schools*. PREVENTING CHRONIC DISEASE, Oct. 2019, at 1, <http://dx.doi.org/10.5888/pcd16.190074>.

<sup>8</sup> AMERICAN LUNG ASSOCIATION, *Children and Air Pollution*, <https://www.lung.org/clean-air/outdoors/who-is-at-risk/children-and-air-pollution> (last visited July 22, 2022).

<sup>9</sup> Joy Hsu et al., *Asthma-Related School Absenteeism, Morbidity, and Modifiable Factors*, 51 AM. J. PREVENTATIVE MEDIC. 23, 23 (2016), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4914465/pdf/nihms759133.pdf>; *see also* Johnson et al., *supra* n.7.

<sup>10</sup> DEPARTMENT OF EDUCATION, *Chronic Absenteeism in the Nation's Schools*, <https://www2.ed.gov/datastory/chronicabsenteeism.html#two> (last visited July 31, 2022).

<sup>11</sup> *Id.*; *see also* WORLD VISION CANADA, *What Is the Cycle of Poverty?*, <https://www.worldvision.ca/stories/child-sponsorship/what-is-the-cycle-of-poverty> (Mar. 4, 2021) (“The cycle of poverty begins when a child is born into a poor family. These families often have limited or no resources to create opportunities to advance themselves, which leaves them stuck in the poverty trap.”)

Mold prevention is a critical step toward reducing costs in households where finances are tight. A 2009 Surgeon General report estimated that the combination of mold and poor ventilation contributed to 21 percent of all asthma cases.<sup>12</sup> These effects are likely magnified in HUD-assisted households because, as discussed, mold is more common in low-income housing and mold is a known problem in HUD-assisted housing.<sup>13</sup> Asthma, like most health issues in the United States, is an exorbitantly expensive ailment. Researchers from the CDC conservatively estimate that asthma costs the U.S. economy more than \$80 billion annually, with the per-person cost totaling approximately \$3,266.<sup>14</sup> While some of these dollars are attributable to healthcare, many are due to lost wages and missed school days.<sup>15</sup> These opportunity costs of asthma attacks are likely borne at disproportionate rates by HUD tenants because children of color and children from low-income backgrounds are “less likely to be prescribed [asthma] medications, less likely to take recommended medications to control their asthma, and are less likely to attend outpatient appointments.”<sup>16</sup> Thus, preventing asthma triggers from taking hold in these homes is vital to keeping residents healthy and alleviating unnecessary remediation costs and burdens.

To keep inspections efficient *and* thorough, experts recommend detecting both mold and conditions conducive to mold with a combination of thermal imaging and moisture meters.<sup>17</sup> First,

---

<sup>12</sup> Lemire et al., *supra* n.3, at 563;

<sup>13</sup> *Id.*; see also Pike *supra* n.3.

<sup>14</sup> AMERICAN THORACIC SOCIETY, *Asthma Costs the U.S. Economy More than \$80 Billion Per Year* (Jan. 12, 2018) <https://www.thoracic.org/about/newsroom/press-releases/journal/2018/asthma-costs-the-us-economy-more-than-80-billion-per-year.php>.

<sup>15</sup> *Id.*

<sup>16</sup> HUD, GUIDE TO SUSTAINING EFFECTIVE ASTHMA HOME INTERVENTION PROGRAMS 1 (June 2018), [https://www.hud.gov/sites/dfiles/HH/documents/HUD%20Asthma%20Guide%20Document\\_Final\\_7\\_18.pdf](https://www.hud.gov/sites/dfiles/HH/documents/HUD%20Asthma%20Guide%20Document_Final_7_18.pdf).

<sup>17</sup> Jim Davis, ENVIRONMENTAL RISK MANAGEMENT, *Mold Tips – Ways to Use Thermal Imaging to Prevent or Find Mold Problems* (Dec. 10, 2015), <https://envrisk.com/2015/12/ways-to-use-thermal-imaging-to-fix-structural-problems-or-mold-problems/>; Paul Probett, *Thermography 101: Thermography and Thermal Images Used in Building Surveys*, [https://inspectapedia.com/home\\_inspection/Thermography\\_Info.php](https://inspectapedia.com/home_inspection/Thermography_Info.php) (last visited July 29, 2022).

inspectors use thermal imaging such as infrared to detect temperature differences that can be indicative of moisture. This should be done in addition to, rather than in place of, a careful visual inspection of the unit to detect water stains or mold-like substances and an olfactory inspection to detect musty odors. Where water stains, odors, or thermal variations are perceived, inspectors can then use a moisture meter to confirm whether there is a mold-risk deficiency. The NSPIRE inspection protocols should reflect these practices to give housing providers the opportunity to prevent mold before it becomes a problem.

While some may say a moisture-related deficiency measured by infrared camera and—if necessary—moisture meter is unnecessary due to existing deficiencies triggered by mold itself,<sup>18</sup> this reactionary approach is misguided. Remediation of an existing mold problem is expensive and may require costly temporary relocation of tenants. A small upfront cost for infrared cameras and moisture meters is preferable, as it both saves money in the long run and appropriately assigns the cost burden to HUD and housing providers, rather than forcing tenants to assume the costs of property damage and health impacts attributable to mold infestations. A moisture-related deficiency will also save residents the burden of reporting mold and seeking out remediation, a process that can be stressful and time-consuming as illustrated by a Boston study that concluded government intervention to correct home asthma triggers like mold were slower and less likely to resolve the problem in racially diverse and low-income neighborhoods.<sup>19</sup> Finally, a moisture check is a sensible and precautionary addition to modern inspections because weatherization projects undertaken for energy efficiency purposes are likely to increase indoor moisture levels.<sup>20</sup> Accordingly, PHLC supports HUD’s proposed deficiency related to moisture detection.

---

<sup>18</sup> HUD, PROPOSED NSPIRE VERSION 2.2, TABLE 41 MOLD-LIKE SUBSTANCE STANDARD 201, [https://www.hud.gov/sites/dfiles/PIH/documents/6092-N-02nspire\\_propose\\_standards.pdf](https://www.hud.gov/sites/dfiles/PIH/documents/6092-N-02nspire_propose_standards.pdf); see also 24 C.F.R. § 5.703(f).

<sup>19</sup> Lemire et al., *supra* n.3, at 568.

<sup>20</sup> Maria Patricia Fabian et al., *A Simulation Model of Building Intervention Impacts on Indoor Environmental Quality, Pediatric Asthma, and Costs*, 133 J. Allergy Clinical Immunology 77, 82 (Jan. 2014), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3874261/>.

## **II. NSPIRE should address safe drinking water.**

PHLC is supportive of HUD's proposal to add the term "safe" to its standards pertaining to drinking water, and for inspectors to enforce this standard by ensuring property managers are checking for water alerts and knowledgeable about their water providers. In addition, property managers should be required to notify HUD of the presence of lead water pipes ahead of the inspection, including independently undertaking an additional inspection to ascertain that information if the pipe composition is unknown. If the property is served by a lead pipe, the HUD inspection should include water quality testing to ensure residents are not being exposed to unsafe levels of lead.

## **III. The HVAC standards should ensure residents are able to maintain their units at a safe and habitable temperature at all times.**

This comment is responsive to Questions 3 through 7 in HUD's Request for Comment.<sup>21</sup> HUD is statutorily obligated to remedy unsafe housing conditions and to provide "decent, safe, and sanitary dwellings."<sup>22</sup> The qualities that constitute "safe" living conditions necessarily evolve over time, both with our understanding of the determinants of health<sup>23</sup> and with our changing environment. As the version 2.2 HVAC standard is currently written, it does not adequately ensure HUD-assisted residents will be provided with safe housing because of the changing physical environment. Specifically, our rapidly changing climate demands that all HUD residents have access to functional heating and cooling.

---

<sup>21</sup> 87 Fed. Reg. 36426, 36429.

<sup>22</sup> 42 U.S.C. §§ 1437, 1437a(b)(1), 1437d(f).

<sup>23</sup> In addition to traditional determinants of health such as genetics and direct environment, modern policy often refers to the social determinants of health, "the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks." U.S. HEALTH & HUMAN SERVICES DEPARTMENT, *Social Determinants of Health*, <https://health.gov/healthypeople/priority-areas/social-determinants-health> (last visited July 26, 2022). Moreover, the social determinants of health are themselves shaped by political determinants. DANIEL DAWES, *THE POLITICAL DETERMINANTS OF HEALTH*, Johns Hopkins University Press (2020). Commenters recognize that all of these various factors play a role in our understanding of health.

In the new climate reality with which all of Earth’s inhabitants are now contending, the only certainty is uncertainty. While the world as a whole is warming, more intense warming rates at the poles are driving extreme winter storms in unexpected regions of the United States.<sup>24</sup> While residents of places like southern Texas may have felt comfortable giving up their heat a few years ago, that decision could have been disastrous during winter storm Uri.<sup>25</sup> Because anthropogenic climate change has ushered in an era of unpredictable and extreme weather patterns, NSPIRE should still require functional, in-unit heating in all states and regions.

Regarding the temperature limits for deficiencies, the World Health Organization (“WHO”) Housing and Health Guidelines endorse a minimum temperature of 18 degrees Celsius (approximately 64.4 degrees Fahrenheit), stating that “there is high certainty that taking measures to warm cold houses will have significant health benefits and a minimum of 18 [degrees Celsius] is widely accepted.”<sup>26</sup> According to the WHO, maintaining units at 18 degrees Celsius or higher is moderately likely to reduce the risk of cardiovascular disease and respiratory ailments.<sup>27</sup> In Australia, researchers found that raising the minimum indoor temperature to 18 degrees was as effective as some lifestyle and dietary interventions in preventing cardiovascular disease.<sup>28</sup> Given these health benefits, PHLC agrees with the use of an ambient temperature thermometer to ensure units are at least 64.4 degrees

---

<sup>24</sup> Judah Cohen et al., *Linking Arctic Variability and Change with Extreme Winter Weather in the United States*, 373 *Science* 1116, 1116 (Sept. 1, 2021), <https://www.science.org/doi/10.1126/science.abi9167>.

<sup>25</sup> See Jess Donald, *Winter Storm Uri 2021: The Economic Impact of the Storm*, (Oct. 2021) <https://comptroller.texas.gov/economy/fiscal-notes/2021/oct/winter-storm-impact.php> (describing the 2021 storm that coated Texas in a sheet of ice and left 210 people dead, some from hypothermia). Of course, the presence of permanent heating in homes will do little good where states fail to provide a reliable power grid, but that problem is beyond the scope of this petition and HUD’s authority.

<sup>26</sup> WORLD HEALTH ORGANIZATION, WHO HOUSING AND HEALTH GUIDELINES, Low Indoor Temperatures and Insulation (2018) <https://www.ncbi.nlm.nih.gov/books/NBK535294/?report=reader>.

<sup>27</sup> *Id.*

<sup>28</sup> Ankur Singh et al., *Estimating Cardiovascular Health Gains from Eradicating Indoor Cold in Australia*, 21 *ENVTL. HEALTH* 54, 54 (2022), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9112519/>.

Fahrenheit. Where units fail this standard, a life-threatening deficiency should be issued. Likewise, PHLC agrees with HUD's proposal to designate temperatures between 64.4 and 68 degrees as severe, non-life-threatening deficiencies because most people would find these temperatures uncomfortably cold for an indoor environment.

However, it is not necessary for the HVAC standards to differentiate between climate zones and seasons. Rather, NSPIRE should simply require permanently installed HVAC equipment sufficient to maintain the unit at safe, habitable temperatures at all times. With this standard in mind, a life-threatening deficiency would be issued if an inspector determined that a permanently installed HVAC system or systems is damaged, inoperable, missing, or not installed and the unit is not between 64.4- and 79-degrees Fahrenheit (or cannot be brought to that temperature within a reasonable time, in instances where residents are purposefully keeping their units outside that range). Although the WHO was not able to come to a consensus on a recommended upper temperature limit for indoor air in 2018, it is well documented that heat harms both physical and mental health.<sup>29</sup> In fact, a 2020 literature review found increased respiratory ailments, increased diabetes morbidity, and increased schizophrenia and dementia symptoms at indoor temperatures of approximately 79 degrees and higher.<sup>30</sup>

Guaranteeing HUD-assisted residents' access to heating *and* cooling is absolutely necessary due to the growing number of extreme, climate change-fueled heat waves sweeping the entire country.<sup>31</sup> Cities that used to remain reliably temperate throughout the year can no longer be counted

---

<sup>29</sup> WORLD HEALTH ORGANIZATION, *supra* n.26, High Indoor Temperatures, <https://www.ncbi.nlm.nih.gov/books/NBK535285/>.

<sup>30</sup> S. Tham et al., Indoor Temperature and Health: A Global Systematic Review, 179 *Public Health* 9, 9 (Feb. 2020).

<sup>31</sup> Isabella Grullón Paz, *Nearly a Third of the U.S. Faces Excessive Heat, with Misery Spreading to the Coasts* (June 20, 2022), <https://www.nytimes.com/2022/07/20/us/heat-advisories-warnings-oklahoma-texas-arkansas.html>.

on to do so.<sup>32</sup> For those without a cool space to retreat to, these heat waves can be deadly. In fact, heat is the leading cause of weather-related deaths in the United States, and the health burdens of extreme heat are disproportionately borne by communities of color and low-income communities.<sup>33</sup> During the Pacific Northwest’s infamous 2021 heat wave, 69 lives were lost in Portland, Oregon alone.<sup>34</sup> The majority of those who died lived in multifamily units, and six people lost their lives in PHA-operated housing complexes.<sup>35</sup> Tellingly, only 3 of the people who perished had working air conditioners.<sup>36</sup>

Notably, the COVID-19 pandemic has also increased the need for residential cooling because people are spending more time in their homes. Without safe and stable access to communal spaces, creating a safe home environment is more paramount than ever. Extreme heat interferes with memory, attention, and reaction time, impeding residents’ abilities to work from home.<sup>37</sup> Moreover, cooling is necessary for mental health as depression, irritability, suicide, aggression, and substance abuse are all associated with extreme heat.<sup>38</sup> Rising temperatures and other climate change induced disasters are also associated with increased domestic and gender-based violence.<sup>39</sup> Given HUD’s statutory

---

<sup>32</sup> See, e.g., April Ehrlich, *Exactly One Year Since “Heat Dome,” Portland Remembers Those Lost* (June 27, 2022), <https://www.opb.org/article/2022/06/27/portland-remembers-people-died-heat-dome-one-year-ago/>.

<sup>33</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, *Climate Change Indicators: Heat-Related Deaths*, <https://www.epa.gov/climate-indicators/climate-change-indicators-heat-related-deaths> (last visited July 20, 2022); see also U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, *LIHEAP IM-2022-06 Heat Stress Flexibilities and Resources FY2022* (July 19, 2022), <https://www.acf.hhs.gov/ocs/policy-guidance/liheap-im-2022-06-heat-stress-flexibilities-and-resources-fy2022>.

<sup>34</sup> See Ehrlich, *supra* n.32 (reflecting on the 69 lives lost during Portland’s 2021 heat wave)

<sup>35</sup> *Id.*

<sup>36</sup> *Id.*

<sup>37</sup> AMERICAN PSYCHIATRIC ASSOCIATION, *Extreme Heat Contributes to Worsening Mental Health, Especially Among Vulnerable Populations* (June 30, 2021), <https://psychiatry.org/news-room/news-releases/extreme-heat-contributes-to-worsening-mental-health>.

<sup>38</sup> *Id.*

<sup>39</sup> *Id.*; Kim Robin van Daalen et al., *Extreme Events and Gender-Based Violence: A Mixed-Methods Systematic Review*, 6 *The Lancet Planetary Health* E504, E518-19 (June 2022).

responsibilities to serve victims of domestic violence,<sup>40</sup> using NSPIRE to improve housing conditions in a manner likely to reduce such violence is the logical choice.

Mandated cooling through NSPIRE will also help to reduce unnecessary evictions in HUD-assisted buildings. At present, residents are sometimes faced with eviction notices due to safety issues with self-installed air conditioning units.<sup>41</sup> However, forcing residents to choose between cooling and homelessness during a time when extreme heat waves are rampant is unconscionable. Many residents report feeling physically ill in their own homes due to intolerable heat, but are unable to afford air conditioners that do not create a fire hazard by blocking windows.<sup>42</sup> Because extreme heat poses just as severe a threat as extreme cold, HUD should recognize lack of air conditioning as a health and safety deficiency. By taking this step, HUD would be appropriately allocating the burden of providing a safe living environment to the housing provider, rather than unfairly burdening tenants with this responsibility.

While it is not necessary to specify immediate conversion to a particular HVAC technology in NSPIRE's definition of permanently installed heating source or permanently installed cooling source, NSPIRE should recognize the harms inherent in fossil-fuel-fired appliances. As explained in greater detail *infra*, residential fossil fuel combustion creates dangerous indoor air pollution and serves as a serious fire risk.<sup>43</sup> Additionally, residential fossil fuel combustion in the United States alone is responsible for 316 million metric tons of carbon dioxide equivalent emissions each year.<sup>44</sup> Thus, in developing this and future versions of NSPIRE and other policy and regulatory proposals, HUD

---

<sup>40</sup> 34 U.S.C. § 12471.

<sup>41</sup> Blair Best, 'It's Horrible': Tenants Face Eviction Over Window AC Units at Low-Income Housing Complex in Newberg, KGW8 (July 26, 2022), <https://www.kgw.com/amp/article/news/local/tenants-face-eviction-window-ac-units/283-a94ed541-e91c-44d8-a0c1-ffcfc2a989>.

<sup>42</sup> *Id.*

<sup>43</sup> See *infra* Section IV.

<sup>44</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2020, Table ES-5* (Apr. 2022), <https://www.epa.gov/system/files/documents/2022-04/us-ghg-inventory-2022-main-text.pdf>.

should be mindful of ways to encourage conversions to technologies that are not directly reliant on fossil fuels. For instance, the definition of permanently installed heating source and permanently installed cooling source should explicitly include air-source heat pumps. Air-source heat pumps far outperform even the most efficient gas furnaces, and they run on electricity rather than on-site combustion of fossil fuels.<sup>45</sup> These features help residents save money on energy bills and avoid unnecessary emissions that fuel the climate crisis.<sup>46</sup>

Though requiring cooling in units where it was not previously required is likely to cause housing providers to take on some additional up-front costs, those costs will pay for themselves over time in efficiency gains.<sup>47</sup> Depending on the geographic region, heat pumps are between 2.4 and 4.5 times more efficient than even the most efficient gas furnaces.<sup>48</sup> Air source heat pumps and other forms of electric heating also avoid the chaotic swings of fossil fuel prices,<sup>49</sup> a benefit that has been emphasized in recent months as volatile international relations with Russia have allowed gas prices to soar.

Even setting aside wartime supply chain issues, gas prices will likely continue to rise as utilities attempt to recoup sunk costs of rapidly depreciating fossil fuel infrastructure in an increasingly

---

<sup>45</sup> John Matson, *Clean Energy 101: Heat Pumps* (July 12, 2022), [https://rmi.org/clean-energy-101-heat-pumps/?utm\\_campaign=organic&utm\\_content=1657657602&utm\\_medium=social&utm\\_source=twitter](https://rmi.org/clean-energy-101-heat-pumps/?utm_campaign=organic&utm_content=1657657602&utm_medium=social&utm_source=twitter); see also U.S. DEPARTMENT OF ENERGY, *Air-Source Heat Pumps*, <https://www.energy.gov/energysaver/air-source-heat-pumps> (last visited July 20, 2022).

<sup>46</sup> See U.S. Department of Energy, *supra* n.45 (projecting average savings of \$300 per year on utility bills).

<sup>47</sup> See Claire McKenna et al., *It's Time to Incentivize Residential Heat Pumps* (June 8, 2020), <https://rmi.org/its-time-to-incentivize-residential-heat-pumps/>.

<sup>48</sup> *Id.*

<sup>49</sup> MATT MALINOWSKI ET AL., CLASP, COMBATING HIGH FUEL PRICES WITH HYBRID HEATING: THE CASE FOR SWAPPING AIR CONDITIONERS WITH HEAT PUMPS 9 (2022), available at <https://www.clasp.ngo/research/all/ac-to-heat-pumps/>.

decarbonizing nation.<sup>50</sup> All of these factors are expected to lower utility costs, allowing affordable housing providers to retain a greater portion of tenant payments for rent. Further, federal policies, such as President Biden’s recent decision to invoke the Defense Production Act to spur heat pump development<sup>51</sup> or Secretary of Energy Granholm’s Cold Climate Heat Pump Challenge,<sup>52</sup> are intended to make heat pumps more efficient and affordable for residents across the country over the coming years. Thus, heat pumps—which are already comparable in cost to fossil-fuel-fired systems when replacing both heating and cooling devices<sup>53</sup>—are likely to become even more financially accessible in the near future.<sup>54</sup>

#### **IV. NSPIRE should label all unvented fuel burning appliances severe, non-life-threatening deficiencies.**

In response to HUD’s question 8, PHLC is supportive of the proposal to create a new deficiency for the presence of unvented, fuel burning space heaters because in-home gas combustion is a major source of hazardous indoor air pollution and a serious fire risk.<sup>55</sup> Furthermore, the same threats

---

<sup>50</sup> See Gannett Fleming, *NYSEG and RGE Depreciation Study: Potential Impacts of Climate Change Policies and Laws I-34* (March 14, 2022) (discussing the “very real possibility that gas demand could decline precipitously and that a significant portion of a utility’s customer base could change energy sources” due to climate change).

<sup>51</sup> U.S. DEPARTMENT OF ENERGY, *President Biden Invokes Defense Production Act to Accelerate Domestic Manufacturing of Clean Energy* (June 6, 2022), <https://www.energy.gov/articles/president-biden-invokes-defense-production-act-accelerate-domestic-manufacturing-clean>.

<sup>52</sup> U.S. DEPARTMENT OF ENERGY, *Residential Cold Climate Heat Pump Challenge*, <https://www.energy.gov/eere/buildings/residential-cold-climate-heat-pump-challenge> (last visited July 26, 2022).

<sup>53</sup> JIM DENNISON ET AL., RMI, *HOW AIR AGENCIES CAN HELP END FOSSIL FUEL POLLUTION FROM BUILDINGS 12* (2021), available at <https://rmi.org/insight/outdoor-air-quality-brief/#:~:text=Replacing%20fossil%20fuel%20appliances%20with,to%20protection%20from%20extreme%20heat>.

<sup>54</sup> See PAIGE JADUN ET AL., NATIONAL RENEWABLE ENERGY LAB, *ELECTRIFICATION FUTURES STUDY: END-USE ELECTRIC TECHNOLOGY COST AND PERFORMANCE PROJECTIONS THROUGH 2050 42* (2017), available at <https://www.nrel.gov/docs/fy18osti/70485.pdf> (projecting lower air source heat pump installation costs and higher efficiencies over the coming decades).

<sup>55</sup> 87 Fed. Reg. 36,426, 36,429.

that justify banning unvented, fuel burning space heaters should also lead HUD to ban unvented cooking appliances and gas cooking appliances more generally. Gas cooking appliances threaten the health of the roughly 45 million U.S. households that use them.<sup>56</sup> As such, HUD should disallow cooking with gas in the Cooking Appliance Standard, mandate that electric ovens meet additional safety standards, and impose a more specific kitchen ventilation standard. These changes would promote healthy homes that reduce the burden of inequitable healthcare and housing systems that uphold systemic racism and cycles of poverty.

**A. The Cooking Appliance standard should require safe, electric cooking appliances.**

For generations, gas-fired stoves, cooktops and ranges (collectively, gas cooking appliances) have been peddled to the public as clean, safe options for home kitchens. But, contrary to the industry's oft-repeated claims, an ever-mounting body of evidence now shows that these appliances are major public health hazards and environmental justice concerns. The gas that fuels the familiar blue cooking flame used in kitchens across the country is actually a complex concoction of chemicals,<sup>57</sup> the most prevalent of which is methane. Methane comprises between 60 and 90 percent of cooking gas,<sup>58</sup> and when combusted, the chemical reaction produces more than just heat. Byproducts of gas combustion include carbon dioxide, nitrogen oxide, nitrogen dioxide, carbon monoxide, particulate matter, and volatile organic compounds ("VOCs") such as formaldehyde.<sup>59</sup> Confined inside kitchen walls, these chemicals degrade air quality in ways that impact the health of all residents, but especially children because of their heightened vulnerability to air pollution.<sup>60</sup>

---

<sup>56</sup> U.S. ENERGY INFORMATION ADMINISTRATION, 2020 Residential Energy Consumption Survey (RECS) Data, *Table HC2.1 Appliances in U.S. Homes, By Housing Unit Type, 2020*, available at <https://www.eia.gov/consumption/residential/data/2020/hc/pdf/HC%203.1.pdf>.

<sup>57</sup> Drew R. Michanowicz et al., *Home Is Where the Pipeline Ends: Characterization of Volatile Organic Compounds Present in Natural Gas at the Point of the Residential End User* 56 ENVTL. SCI. & TECH. 10258, 10258 (2022) (identifying 296 volatile organic compounds aside from methane in cooking gas samples).

<sup>58</sup> *Id.*

<sup>59</sup> Zhu et al., *supra* n.7 at 6, 11.

<sup>60</sup> *See supra* n.8 and associated text.

Among the gas combustion pollutants affecting lung health, nitrogen dioxide is one of the most concerning. A 1992 meta-analysis concluded children who were exposed to elevated levels of nitrogen dioxide were 20 percent more likely to suffer from a respiratory illness.<sup>61</sup> More than twenty years later, when the analysis was updated and improved with modern research and methods, evidence showed that for every 15 parts per billion (ppb) increase in indoor nitrogen dioxide levels, children were 15 percent more likely to experience wheezing.<sup>62</sup> Around the same time, a New England-based study of elementary school-age children confirmed that even low levels of nitrogen dioxide contribute to asthma morbidity.<sup>63</sup> Evidence also suggests respiratory impacts may be worse in multifamily housing, especially on upper floors.<sup>64</sup>

Beyond respiratory impacts, a meta-analysis uncovered a statistically significant relationship between prenatal nitrogen dioxide exposure and negative impacts on psychomotor skills in children.<sup>65</sup> The authors also found studies suggesting a relationship between in-utero nitrogen dioxide exposure and impaired IQ and behavioral issues, though they called for more research into the subject.<sup>66</sup> Similarly, a 2009 study found evidence that children under four who were exposed to higher nitrogen

---

<sup>61</sup> Vic Hasselblad et al., *Synthesis of Environmental Evidence: Nitrogen Dioxide Epidemiology Studies*, 42 J. AIR & WASTE MGMT. STUDIES 662, 669 (1992) (“[T]aken as a whole, the collective evidence from the evaluated studies strongly suggests an increase of at least 20 percent in the odds of respiratory illness in children exposed to an increase of 30 µg/m<sup>3</sup> NO<sub>2</sub> for extended periods of time.”).

<sup>62</sup> Weiwei Lin et al., *Meta-analysis of the effects of indoor nitrogen dioxide and gas cooking on asthma and wheeze in children*, 42 INT’L J. OF EPIDEMIOLOGY 1724, 1731 (2013).

<sup>63</sup> Kathleen Belanger et al., *Household Levels of Nitrogen Dioxide and Pediatric Asthma*, 24 EPIDEMIOLOGY 320, 325 (March 2013).

<sup>64</sup> DR. DENNIS J. KOTCHMAR ET AL., U.S. ENVIRONMENTAL PROTECTION AGENCY, INTEGRATED SCIENCE ASSESSMENT FOR NITROGEN DIOXIDE – HEALTH CRITERIA 3-21 (July 2008); Patricia Fabian et al., *Simulating Indoor Concentrations of NO<sub>2</sub> and PM<sub>2.5</sub> in Multi-family Housing for Use in Health-Based Intervention Modeling*, 22 INDOOR AIR 12, 14 (2012).

<sup>65</sup> Li Shang et al., *Effects of Prenatal Exposure to NO<sub>x</sub> on Children’s Neurological Development: A Systematic Review and Meta-analysis*, 27 ENVTL. SCI & POLLUTION RES. 24786, 24794-24796 (2020).

<sup>66</sup> *Id.*

dioxide levels were at greater risk of developing ADHD symptoms and experiencing lower cognitive outcomes.<sup>67</sup>

Harm stemming from nitrogen dioxide pollution is not confined to children and those with existing respiratory diseases. In adults, nitrogen dioxide pollution is associated with increased instances of cardiovascular disease<sup>68</sup> and even increased COVID-19 mortalities.<sup>69</sup> Further, a 2008 EPA report described a host of adverse health impacts that even small amounts of nitrogen dioxide can cause in the general population. These include enhanced susceptibility to respiratory infection, airway inflammation, and heightened allergic responses.<sup>70</sup> Given these demonstrated harms, an equitable approach to healthy housing demands that HUD do everything in its power to remove indoor sources of nitrogen dioxide from homes within the agency's purview. This includes gas cooking appliances.

A California study recently highlighted the connection between elevated nitrogen dioxide and gas cooking appliances. Specifically, the researchers found that “where a stove and oven are used simultaneously for one hour, peak concentrations of [nitrogen dioxide] from cooking with gas appliances exceed the levels of acute national and California-based ambient air quality thresholds in more than 90% of modeled emission scenarios.”<sup>71</sup> This conclusion validated a previous study of Southern California residents which indicated gas stoves create somewhere between 25 and 39 percent of in-home nitrogen dioxide, and that 70 percent of households that cooked with gas at least once per

---

<sup>67</sup> Eva Morales et al., *Association of Early-Life Exposure to Household Gas Appliances and Indoor Nitrogen Dioxide with Cognition and Attention Behavior in Preschoolers*, 169 AM. J. OF EPIDEMIOLOGY 1327, 1331 (2009).

<sup>68</sup> Kai Luo et al., NATURE, *Acute Impacts of Nitrogen Dioxide on Cardiovascular Mortality in Beijing: An Exploration of Spatial Heterogeneity and the District-Specific Predictors* 5 (Dec. 2, 2016) <https://www.nature.com/articles/srep38328.pdf>.

<sup>69</sup> Marco Mele et al., *NO<sub>2</sub> Levels As a Contributing Factor to COVID-19 Deaths: The First Empirical Estimate of Threshold Values*, ENVTL. RES. Mar. 2021, at 10, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7783466/pdf/main.pdf>.

<sup>70</sup> Kotchmar et al., *supra* n.64 at 3-5, 3-9, 3-17, 3-41.

<sup>71</sup> Zhu et al., *supra* n.7, at 6.

week experienced pollution levels that exceeded ambient air quality standards.<sup>72</sup> Thus, under EPA’s standards for outdoor air quality, approximately 12 million Americans in Southern California alone are regularly exposed to dangerous indoor nitrogen dioxide levels from gas cooking appliances.<sup>73</sup>

Similar research on the East Coast indicates the nexus between gas stoves and adverse health impacts is not limited to any one region. In a simulation modeled on one thousand households living in Boston public housing units, nearly 100 percent of households in the highest quartile for nitrogen dioxide concentrations had a gas stove, used a gas oven for supplemental heating in the winter, and did not operate a fan<sup>74</sup> while cooking.<sup>75</sup> Conversely, in the lowest quartile, only 44 percent of households owned a gas stove and 49 percent did not operate the fan while cooking.<sup>76</sup> Accordingly, gas stoves were deemed the biggest contributor to indoor nitrogen dioxide—a conclusion with which the EPA now concurs.<sup>77</sup> In fact, according to an EPA-cited study, peak nitrogen dioxide concentrations from cooking with a gas range are between 375 and 673 ppb.<sup>78</sup> For reference, the National Ambient Air Quality Standard (EPA’s outdoor limit) for one-hour exposure to nitrogen dioxide is 100 ppb.<sup>79</sup> Thus,

---

<sup>72</sup> Jennifer M. Logue et al., *Pollutant Exposures from Natural Gas Cooking Burners: A Simulation-Based Assessment for Southern Californians*, 122 ENVTL. HEALTH PERSPECTIVES 43, 46, 49 (Jan. 2014).

<sup>73</sup> *Id.* at 49.

<sup>74</sup> Fans differ from true ventilation in that they merely circulate indoor air rather than exhausting to the outside. While fans may lower pollutant concentrations by distributing the pollutants more widely throughout the home, they are not nearly as effective as ventilation. Ventilation is discussed more fully *infra* Section IV.B.

<sup>75</sup> Fabian et al., *supra* n.64, at 18.

<sup>76</sup> *Id.*

<sup>77</sup> *Id.* at 20; *see also* Kotchmar, *supra* n.64, at 2-28 (calling combustion of fossil and biomass fuels “the major indoor source of nitrogen”).

<sup>78</sup> Kotchmar, *supra* n.64, at 2-39; *see also* Thomas, Michael [@curious\_founder]. “Here’s what happened every night when we used our stove or oven.” TWITTER, Jan. 13, 2022, [https://twitter.com/curious\\_founder/status/1481746472370520067](https://twitter.com/curious_founder/status/1481746472370520067) (providing data from a homeowner who measured nitrogen dioxide while cooking).

<sup>79</sup> EPA, *Review of the Primary National Ambient Air Quality Standards for Oxides of Nitrogen*, 83 Fed. Reg. 17,226, 17,226-27 (April 18, 2018).

even under the United States' relatively weak limits,<sup>80</sup> gas cooking appliances are regularly causing indoor pollution to severely exceed outdoor air quality standards.

Although nitrogen dioxide is one of the most harmful pollutants produced by gas cooking, it is far from the only pollutant of concern.<sup>81</sup> As mentioned, gas combustion also releases pollutants like particulate matter, carbon monoxide, and formaldehyde.<sup>82</sup> Each of these chemicals poses a unique threat to human health that could also be mitigated by eliminating gas from home kitchens.

Particulate matter, tiny pieces of airborne liquid and solid chemicals, comes in three sizes: PM10 (particles less than 10 micrometers in diameter), PM2.5 (particles less than 2.5 micrometers in diameter), and UFP (“ultrafine particles”) or particles less than 100 nanometers in diameter.<sup>83</sup> Humans inhale these tiny particles deep into their lungs where the pollution can then make its way into our

---

<sup>80</sup> Notably, Canada’s short-term, residential limit for nitrogen dioxide is 90 ppb, a value that would have been set even lower to protect asthmatics and people with COPD were it not for the fact that most homes with gas stoves would have been out of compliance. *Residential Indoor Air Quality Guideline: Nitrogen Dioxide* (Nov. 26, 2015), <https://www.canada.ca/en/health-canada/services/publications/healthy-living/residential-indoor-air-quality-guideline-nitrogen-dioxide.html#c4a>. The WHO guideline, which applies to indoor as well as outdoor concentrations, is even lower. WORLD HEALTH ORGANIZATION, *Ambient (outdoor) Air Pollution* (Sept. 22, 2021), [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health#:~:text=The%20current%20WHO%20guideline%20value,effects%20of%20gaseous%20nitrogen%20dioxide](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health#:~:text=The%20current%20WHO%20guideline%20value,effects%20of%20gaseous%20nitrogen%20dioxide) (listing the recommended 24-hour mean limit as 25 µg/m<sup>3</sup> which equates to approximately 13 ppb and explaining that there is no scientific basis for indoor standards to differ from outdoor standards).

<sup>81</sup> See Lin et al., *supra* n.62, at 1734 (referencing an Australian study that found the association between gas cooking and adverse respiratory symptoms persisted even after adjusting for nitrogen dioxide).

<sup>82</sup> Zhu et al., *supra* n.59.

<sup>83</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, *Particulate Matter (PM) Basics*, <https://www.epa.gov/pm-pollution/particulate-matter-pm-basics#:~:text=PM%20stands%20for%20particulate%20matter,seen%20with%20the%20naked%20eye> (last visited July 20, 2022); see also BRADY ANNE SEALS & ANDEE KRASNER, HEALTH EFFECTS FROM GAS STOVE POLLUTION 8 (May 2020), <https://www.psr.org/wp-content/uploads/2020/05/health-effects-from-gas-stove-pollution.pdf>.

bloodstreams, disrupting the respiratory and cardiovascular systems.<sup>84</sup> Symptoms associated with particulate matter exposure include irregular heartbeat, heart attacks, asthma, decreased lung function, and even premature death in people with heart or lung disease.<sup>85</sup>

Particulate matter is emitted directly during the cooking process, but it is also created when other combustion byproducts like nitrogen oxides react with chemicals in the air.<sup>86</sup> While all heat cooking methods release some particulate matter, gas stoves emit twice as much as electric stoves.<sup>87</sup> This extra pollution is especially harmful in places where ambient particulate matter is already high due to disproportionate exposure to traffic and industrial sources of pollution, as is the case in many of the low-income, marginalized neighborhoods where NSPIRE is likely to apply.<sup>88</sup> Indeed, it is increasingly important to eradicate controllable sources of particulate matter in light of the growing number of people who are regularly exposed to severe wildfire smoke, another major source of particle pollution.<sup>89</sup>

Though much of the existing research on pollution from gas cooking appliances focuses on nitrogen dioxide and particulate matter, there are several other harmful pollutants produced by cooking with gas. The most well-known of these pollutants is carbon monoxide, which HUD

---

<sup>84</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, *Health and Environmental Effects of Particulate Matter*, <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm> (last visited July 20, 2022).

<sup>85</sup> *Id.*

<sup>86</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, *Particulate Matter (PM) Basics*, <https://www.epa.gov/pm-pollution/particulate-matter-pm-basics#:~:text=PM%20stands%20for%20particulate%20matter,seen%20with%20the%20naked%20eye> (last visited July 20, 2022); *see also* Seals & Krasner, *supra* n.83, at 8.

<sup>87</sup> TIANCHAO HU ET AL., BERKELEY NAT'L LAB., COMPILATION OF PUBLISHED PM<sub>2.5</sub> EMISSION RATES FOR COOKING, CANDLES AND INCENSE FOR USE IN MODELING OF EXPOSURES IN RESIDENCES 11 (Aug. 2012), <https://doi.org/10.2172/1172959>.

<sup>88</sup> *See* Christina M. Pacheco et al., *Homes of Low-Income Minority Families with Asthmatic Children Have Increased Condition Issues*, 35 ASTHMA & ALLERGY PROCEEDINGS 467, 468 (2014).

<sup>89</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, *Why Wildfire Smoke Is a Health Concern*, <https://www.epa.gov/wildfire-smoke-course/why-wildfire-smoke-health-concern> (last visited July 19, 2022).

correctly identifies as a major risk associated with unvented fuel-powered space heaters.<sup>90</sup> According to the CDC, carbon monoxide is the leading cause of nondrug poisoning deaths in the United States.<sup>91</sup> At lower concentrations, carbon monoxide causes fatigue, impaired vision, headaches, reduced brain function, and chest pain.<sup>92</sup> While carbon monoxide has many sources, fuel-powered space heaters are among the top contributors to carbon monoxide deaths.<sup>93</sup> As such, NSPIRE should recognize these appliances as a deficiency.

However, space heaters are not the only sources of carbon monoxide that NSPIRE should include as deficiencies. EPA recognizes that homes with gas stoves have higher carbon monoxide levels than homes without gas stoves, and that some gas stoves create carbon monoxide levels at or near the levels permitted by outdoor air quality standards.<sup>94</sup> Given the multiple sources of carbon monoxide

---

<sup>90</sup> See U.S. ENVIRONMENTAL PROTECTION AGENCY, *Carbon Monoxide's Impact on Indoor Air Quality*, <https://www.epa.gov/indoor-air-quality-iaq/carbon-monoxides-impact-indoor-air-quality> (listing gas stoves as a source of carbon monoxide and describing health effects of exposure) (last visited July 19, 2022); CONSUMER PRODUCT SAFETY COMMISSION, *CPSC Urges Caution with Heating as Winter Weather Arrives; Carbon Monoxide Deaths on the Rise* (Dec. 22, 2009), <https://www.cpsc.gov/Newsroom/News-Releases/2010/CPSC-Urges-Caution-with-Heating-as-Winter-Weather-Arrives-Carbon-Monoxide-Deaths-on-the-Rise>.

<sup>91</sup> CENTER FOR DISEASE CONTROL, POISONING: PICTURE OF AMERICA REPORT 1, [https://www.cdc.gov/pictureofamerica/pdfs/Picture\\_of\\_America\\_Poisoning.pdf](https://www.cdc.gov/pictureofamerica/pdfs/Picture_of_America_Poisoning.pdf) (last visited July 31, 2022).

<sup>92</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, *Carbon Monoxide's Impact on Indoor Air Quality*, <https://www.epa.gov/indoor-air-quality-iaq/carbon-monoxides-impact-indoor-air-quality> (last visited July 19, 2022).

<sup>93</sup> CONSUMER PRODUCT SAFETY COMMISSION, *CPSC Urges Caution with Heating as Winter Weather Arrives; Carbon Monoxide Deaths on the Rise* (Dec. 22, 2009) <https://www.cpsc.gov/Newsroom/News-Releases/2010/CPSC-Urges-Caution-with-Heating-as-Winter-Weather-Arrives-Carbon-Monoxide-Deaths-on-the-Rise>; JOHNS HOPKINS MEDICINE, *Carbon Monoxide Poisoning*, <https://www.hopkinsmedicine.org/health/conditions-and-diseases/carbon-monoxide-poisoning#:~:text=The%20most%20common%20source%20of,the%20room%2C%20instead%20of%20outdoors> (last visited July 19, 2022).

<sup>94</sup> See U.S. ENVIRONMENTAL PROTECTION AGENCY, *Carbon Monoxide's Impact on Indoor Air Quality*, <https://www.epa.gov/indoor-air-quality-iaq/carbon-monoxides-impact-indoor-air-quality> (last visited July 19, 2022) (acknowledging that gas stoves can create conditions that exceed 30ppm

likely to be acting in tandem on indoor air quality at any given moment, this level of pollution from gas cooking appliances is unacceptable. These appliances should be noted by inspectors as a severe, non-life-threatening deficiencies that must be replaced with safer alternatives.

In addition to carbon monoxide, research indicates "that natural gas combustion could be a substantial source of PAHs [polycyclic aromatic hydrocarbons] in indoor environments."<sup>95</sup> According to the CDC, elevated PAH levels may lead to everything from skin irritation and breathing problems to cancer.<sup>96</sup> Further, gas stoves release volatile organic compounds like formaldehyde and benzene.<sup>97</sup> Formaldehyde, one of the major products of natural gas combustion,<sup>98</sup> is a carcinogen that also contributes to asthma and respiratory distress.<sup>99</sup> Benzene, another carcinogen, is a product of the incomplete combustion of gas.<sup>100</sup> According to WHO guidelines, the use of gas for cooking leads to higher concentrations of benzene indoors.<sup>101</sup> Notably, those guidelines make explicit that "no safe level of [benzene] can be recommended."<sup>102</sup>

---

carbon dioxide); *see also* Zhu et al., *supra* n.7, at 13 (noting that "CO concentrations above the [California Ambient Air Quality Standards] 8-hour standard of 10 mg/m<sup>3</sup> have been reported during preparation of a full meal and under broiling conditions, without range hood use (though these were peak values and these concentrations did not persist for an entire 8-hour period)"); 40 C.F.R. § 50.8 (setting NAAQS for carbon monoxide at 9 ppm for 8-hour exposure window and 35ppm for a 1-hour exposure window).

<sup>95</sup> Kotchmar, *supra* n.64, at 2-55 – 2-56.

<sup>96</sup> U.S. CENTER FOR DISEASE CONTROL, *Polycyclic Aromatic Hydrocarbons (PAHs) Fact Sheet*, [https://www.cdc.gov/biomonitoring/PAHs\\_FactSheet.html](https://www.cdc.gov/biomonitoring/PAHs_FactSheet.html). (last visited July 19, 2022).

<sup>97</sup> Kotchmar, *supra* n.64, at 2-54;

<sup>98</sup> Kotchmar, *supra* n.64, at 2-54.

<sup>99</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, *What Should I Know About Formaldehyde and Indoor Air Quality*, <https://www.epa.gov/indoor-air-quality-iaq/what-should-i-know-about-formaldehyde-and-indoor-air-quality> (last visited July 19, 2022).

<sup>100</sup> *See* Megan Woolhouse, BU TODAY, *The Problem with Cooking with (Fracked) Gas*, <https://www.bu.edu/articles/2018/the-problem-with-cooking-with-fracked-gas/> (Mar. 20, 2018) (including an interview with Boston University professor Nathan Phillips).

<sup>101</sup> ROY HARRISON ET AL., WORLD HEALTH ORGANIZATION, WHO GUIDELINES FOR INDOOR AIR QUALITY: SELECTED POLLUTANTS (2010), <https://www.ncbi.nlm.nih.gov/books/NBK138708/>.

<sup>102</sup> *Id.*

Given the dangers posed by even trace amounts of benzene, emerging research that found benzene in 95 percent of gas samples collected throughout the Boston metropolitan area is highly concerning.<sup>103</sup> Alarming, benzene was far from the only hazardous pollutant present in the gas sampled. In total, the experimenters determined that Boston’s gas supply contained 296 volatile organic compounds aside from methane, 21 of which were designated hazardous air pollutants.<sup>104</sup> The presence of these chemicals in unburned gas is especially worrisome because more than 75 percent of methane emissions from residential gas cooking appliances originate from leaks while the appliances are turned off.<sup>105</sup> These findings indicate that kitchen gas lines are leaking a constant stream of not only methane, but also numerous other hazardous air pollutants into the homes they serve.<sup>106</sup>

As research continues into the non-methane substances present in gas, we can expect more information about the direct pathways of the health impacts of gas cooking to emerge. But, regardless of the precise chemical root of associated ailments, the harms stemming from gas cooking appliances are more than theoretical. A 2013 analysis estimated that children living in homes that cook with gas are 42 percent more likely to presently have asthma and 24 percent more likely to have asthma at some point during their lives.<sup>107</sup> Relatedly, a 2014 cost analysis of healthy home interventions listed replacing gas stoves as one of the most cost-effective ways to reduce asthma morbidity.<sup>108</sup>

Reducing healthcare costs for households whose units are subject to NSPIRE should be a top priority given HUD’s interest in promoting equity.<sup>109</sup> The low-income populations and marginalized

---

<sup>103</sup> Mechanowicz et al., *supra* n.57, at 10258.

<sup>104</sup> *Id.*

<sup>105</sup> Eric D. Lebel et al., *Methane and NOx Emissions from Natural Gas Stoves, Cooktops, and Ovens in Residential Homes*, 56 ENVTL. SCI. & TECH. 2529, 2529 (2022).

<sup>106</sup> *See id.* at 2534 (“[M]ost stoves and associated nearby piping leak some methane continuously.”); Mechanowicz et al., *supra* n.57, at 10262 (describing hazardous air pollutants commonly found in gas samples).

<sup>107</sup> Lin et al., *supra* n.62, at 1728.

<sup>108</sup> Fabian et al., *supra* n.20, at Fig.4.

<sup>109</sup> *See generally* HUD, EQUITY ACTION PLAN (2022)

<https://www.hud.gov/sites/dfiles/PA/documents/HUDEquity508compliant.pdf>.

communities that HUD primarily serves are more likely to suffer from poor health and disabilities that simultaneously drive up healthcare costs and prevent individuals from bringing home a steady income.<sup>110</sup> HUD-assisted housing—especially public housing—is also largely occupied by women-led households and families with children.<sup>111</sup> Overall, women make only 83 cents for every dollar that men make, and the pay gap is even larger when comparing Black and Hispanic women to white men.<sup>112</sup> Given that children are at greater risk of suffering adverse health impacts from gas stove pollutants, these factors interact to increase healthcare burdens on the precise populations HUD serves.

Using NSPIRE to protect households from the harms associated with gas stoves is also particularly important because the physical characteristics of HUD-assisted housing often amplify health risks. First, pollution impacts are likely to be more intense in multifamily buildings,<sup>113</sup> in part because “upper-level apartments have higher humidity and pollutant levels.”<sup>114</sup> Second, multifamily buildings tend to have smaller living spaces, which contributes to higher concentrations of indoor nitrogen dioxide, carbon monoxide, and other pollutants.<sup>115</sup> Third, multifamily properties—and low-income households more generally—are also distinguished by higher occupant density,<sup>116</sup> meaning gas cooking appliances are used more frequently. Fourth, individuals living in multifamily housing have less control over the temperature in their units and may use polluting gas ovens and space heaters for

---

<sup>110</sup> Dhruv Khullar & Dave A. Chokshi, *Health, Income, & Poverty: Where We Are and What Could Help* (Oct. 4, 2018) <https://www.healthaffairs.org/doi/10.1377/hpb20180817.901935/>;

<sup>111</sup> See HUD, *Assisted Housing: National and Local*, available at <https://www.huduser.gov/portal/datasets/assthsg.html> (last accessed July 31, 2022) (showing that, in 2021, 33% of public housing units were occupied by a female head of household with children).

<sup>112</sup> AMERICAN ASSOCIATION OF UNIVERSITY WOMEN, *THE SIMPLE TRUTH ABOUT THE GENDER PAY GAP 3* (2021 Update)

[https://www.aauw.org/app/uploads/2021/09/AAUW\\_SimpleTruth\\_2021\\_fall\\_update.pdf](https://www.aauw.org/app/uploads/2021/09/AAUW_SimpleTruth_2021_fall_update.pdf).

<sup>113</sup> See Kotchmar, *supra* n.64, at 3-21 (noting that children in multifamily buildings are exposed to higher nitrogen dioxide levels than children in single-family homes).

<sup>114</sup> Fabian et al., *supra* n.64, at 2.

<sup>115</sup> Zhu et al., *supra* n.7, at 6, 10.

<sup>116</sup> Seals & Krasner, *supra* n.83, at 14.

supplemental heat in the winter.<sup>117</sup> Fifth, because much of the housing to which NSPIRE would apply is somewhat concentrated in urban settings,<sup>118</sup> HUD-assisted residents are more likely to experience cumulative health impacts from urban heat island effects.<sup>119</sup> Finally, HUD-assisted multifamily buildings are often situated in areas with high outdoor pollution levels, and these cumulative contaminant sources exacerbate personal exposure levels.<sup>120</sup> Accordingly, regulating gas cooking appliances in HUD-assisted properties will promote equity by reducing disparities in health risks and costs across income levels and racial divides.

Due to the overwhelming evidence that gas cooking appliances and fuel-powered space heaters are causing unacceptable levels of pollution that undermine HUD’s environmental justice commitments<sup>121</sup> and President Biden’s Justice40 initiative,<sup>122</sup> NSPIRE should not permit these

---

<sup>117</sup> *Id.*; see also Fabian et al., *supra* n.64, at 7, 10 (describing use of ovens for supplemental heat in Boston public housing units and explaining that units with the highest nitrogen dioxide levels used gas stoves for heat); YU ANN TAN ET AL., RMI, DECARBONIZING HOMES: IMPROVING HEALTH IN LOW-INCOME COMMUNITIES THROUGH BENEFICIAL ELECTRIFICATION (Oct. 2021) (estimating that children in homes that use gas ovens for supplemental heat are 80 percent more likely to have asthma); Seals & Krasner, *supra* n.83, at 14 (in a study of 150 asthmatic pre-schoolers, finding “that 14 percent of households use the stove/oven as a source of heat, which consistently produced higher levels of NO<sub>2</sub> than using stoves only for cooking”).

<sup>118</sup> CENTER ON BUDGET AND POLICY PRIORITIES, *Rental Assistance in Urban and Rural Areas* (May 12, 2015), <https://www.cbpp.org/sites/default/files/atoms/files/RentalAssistance-RuralFactsheetandMethodology.pdf> (estimating that just 13 percent of HUD-assisted public housing, Section 8 HCV, and multifamily units were outside major metropolitan areas).

<sup>119</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, *Heat Island Effect*, <https://www.epa.gov/heatislands> (last visited July 26, 2022) (explaining that urban environments generally have higher temperatures).

<sup>120</sup> Tan et al., *supra* n.117, at 28; Pacheco, *supra* n.88, at 468.

<sup>121</sup> HUD, CLIMATE ACTION PLAN 30 (Nov. 2021), <https://www.hud.gov/sites/dfiles/Main/documents/HUD-Climate-Action-Plan.pdf> (“Addressing climate and environmental justice is at the core of HUD’s mission to create strong, sustainable, inclusive communities.”).

<sup>122</sup> See HUD, *Pursuing Environmental Justice*, [https://www.hud.gov/climate/environmental\\_justice](https://www.hud.gov/climate/environmental_justice) (last visited July 30, 2022) (“HUD strongly supports Justice40, the Administration’s whole-of-government effort to ensure that at least 40 percent of overall Federal investments in climate and clean energy are delivered to disadvantaged communities.”).

appliances in covered properties. Indeed, a reasonable interpretation of HUD’s existing health and safety standards already requires the removal of these technologies.<sup>123</sup> Tellingly, HUD acted on a similarly harmful source of indoor air pollution—cigarettes—when it required that PHAs implement smoke-free policies by 2017.<sup>124</sup> NSPIRE must be at least as protective as existing regulatory standards. To achieve this goal, HUD must require that properties subject to NSPIRE be equipped with an electric oven and cooktop that complies with the UL 858 Standard for Household Electric Ranges, as discussed in further detail *infra* Section IV.C.<sup>125</sup>

## **B. NSPIRE must require adequate kitchen ventilation.**

The issue of gas-fired kitchen appliance pollution is also linked to the standard for Kitchen Ventilation.<sup>126</sup> At present, this standard requires a “mechanical system that transports air from the kitchen to the outside.”<sup>127</sup> Though HUD’s existing standard rightly mandates ventilation systems that do more than merely circulate polluted air, a stricter standard is still necessary to prevent hazardous air quality conditions inside HUD-assisted homes. Moreover, even adequate ventilation does not remove

---

<sup>123</sup> See 24 C.F.R. § 5.703(f) (requiring that HUD housing units be free from air quality hazards, including propane, methane, and natural gas); 24 C.F.R. § 982.401(h) (requiring that Section 8 housing be free from “pollutants in the air that threaten the health of residents,” including “dangerous levels of carbon monoxide, fuel gas, and other harmful pollutants”).

<sup>124</sup> Instituting Smoke-Free Public Housing, 81 Fed. Reg. 87,430 (Dec. 5, 2016); *see also* Hilary Bambrick et al., CLIMATE COUNCIL OF AUSTRALIA, KICKING THE GAS HABIT: HOW GAS IS HARMING OUR HEALTH 25 (2021), <https://www.climatecouncil.org.au/wp-content/uploads/2021/05/Kicking-the-Gas-Habit-How-Gas-is-Harming-our-Health.pdf> (likening asthma risk from gas stoves to that of secondhand smoke).

<sup>125</sup> The UL 858 Standard specifies a maximum surface temperature for the outside of the oven, helping to prevent burns, and limits cooktop temperature to prevent cooking fires. UL STANDARDS AND ENGAGEMENT, *Household Oven and Range Standards: Helping to Mitigate the Risk of Burns*, <https://ulse.org/standards-and-engagement/standards-matter/household-oven-and-range-standards-helping#:~:text=By%20specifying%20maximum%20surface%20temperature,with%20doors%2C%20handles%20or%20knobs> (last visited July 19, 2022).

<sup>126</sup> HUD, VERSION 2.2 NATIONAL STANDARDS FOR THE PHYSICAL INSPECTION OF REAL ESTATE, Table 35 Kitchen Ventilation Standard 175, [https://www.hud.gov/sites/dfiles/PIH/documents/6092-N-02nspire\\_propose\\_standards.pdf](https://www.hud.gov/sites/dfiles/PIH/documents/6092-N-02nspire_propose_standards.pdf).

<sup>127</sup> *Id.*

all hazardous gas stove pollutants from homes. Therefore, NSPIRE must include ventilation requirements *in addition to* prohibiting gas stoves.

As discussed, all cooking—and especially gas-fired cooking—produces significant amounts of pollution. When used properly, functioning ventilation systems can reduce in-home pollutant levels and prevent exposure-induced illnesses.<sup>128</sup> For example, one simulation model predicted that running a working fan<sup>129</sup> while cooking could reduce mean PM<sub>2.5</sub> concentrations from 27.8 µg/m<sup>3</sup> to 10.9 µg/m<sup>3</sup>.<sup>130</sup> This indicates that effective fans could make the difference between a unit meeting or exceeding the WHO exposure limits for 24-hour PM<sub>2.5</sub> concentrations.<sup>131</sup> Eliminating as much PM<sub>2.5</sub> as possible is imperative as the most recent assessment released by EPA recognizes any exposure level above zero is liable to cause or contribute to a host of health problems including, but not limited to, respiratory and cardiovascular ailments and overall mortality.<sup>132</sup>

Many existing HUD regulations link to ASHRAE<sup>133</sup> standards, such as Standard 90.1 related to energy efficient building design.<sup>134</sup> Yet, similarly rigorous standards have not been implemented to safeguard indoor air quality by requiring up-to-date ventilation systems. The impact of this omission is evident. For instance, in Boston only 13 percent of public housing units have working exhaust fans, let alone ventilation systems that meet the design specifications of the most recent ASHRAE standard for

---

<sup>128</sup> See Zhu, *supra* n.7, at 16 (explaining benefits of range hoods and listing sources).

<sup>129</sup> In this simulation, a working exhaust fan was assumed to maintain an exhaust rate of 85 m<sup>3</sup>/hr. Fabian et al., *supra* n. 64, at 4.

<sup>130</sup> Fabian et al., *supra* n.64, at 9.

<sup>131</sup> See WORLD HEALTH ORGANIZATION, WHO GLOBAL AIR QUALITY GUIDELINES: EXECUTIVE SUMMARY 4 (2021), <https://apps.who.int/iris/bitstream/handle/10665/345334/9789240034433-eng.pdf> (setting the ideal 24-hour PM<sub>2.5</sub> standard at 15 µg/m<sup>3</sup>).

<sup>132</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, SUPPLEMENT TO THE 2019 INTEGRATED SCIENCE ASSESSMENT FOR PARTICULATE MATTER, 2-29 (May 2022).

<sup>133</sup> ASHRAE—the American Society of Heating, Refrigerating, and Air-Conditioning Engineers—is an internationally recognized organization dedicated to creating a healthy and sustainable built environment. ASHRAE, *ASHRAE's Mission and Vision*, <https://www.ashrae.org/about/mission-and-vision> (last visited July 31, 2022).

<sup>134</sup> 24 C.F.R. § 93.301(a); 24 C.F.R. § 905.108.

minimum ventilation requirements.<sup>135</sup> In California, approximately 47 percent of homes do not have systems that comply with minimum ventilation standards, and 7 percent of homes have no ventilation at all.<sup>136</sup> ASHRAE Standard 62.2-2019 requires that systems be capable of achieving a ventilation rate designed to ensure indoor air quality remains at an acceptable level.<sup>137</sup> Including this standard in the NSPIRE program would achieve tangible improvements to the health and wellbeing of HUD-assisted residents.<sup>138</sup>

Without a doubt, adequate kitchen ventilation is necessary to provide HUD-assisted families with decent, safe, and sanitary living conditions as it relates to certain pollutants. However, it is important to recognize that even kitchen ventilation in compliance with ASHRAE Standard 62.2 cannot make gas stoves safe. Functioning ventilation systems reduce gas cooking pollution—they do not eliminate it.<sup>139</sup> In a study of 152 affordable homes across New York City and Chicago, researchers found that even compliance with ASHRAE Standard 62.2-2019 (*Ventilation and Acceptable Indoor Air Quality in Residential Buildings*) was not effective in removing nitrogen dioxide from the indoor

---

<sup>135</sup> Fabian et al., *supra* n.64, at 5; *see also* Seals & Krasner, *supra* n.83, at 14 (discussing lack of working exhaust hoods in Baltimore’s inner-city). ASHRAE provides additional guidance as to how low-rise residential buildings can achieve indoor air quality improvements beyond the minimum requirements in Guideline 24-2015, and guidance for all residential buildings in the 2018 book, *Residential Indoor Air Quality Guide: Best Practices for Acquisition, Design, Construction, Maintenance and Operation*. ANSI/ASHRAE STANDARD 62.2-2019: VENTILATION AND ACCEPTABLE INDOOR AIR QUALITY IN RESIDENTIAL BUILDINGS 4 (2019), available at [https://ashrae.iwrapper.com/ASHRAE\\_PREVIEW\\_ONLY\\_STANDARDS/STD\\_62.2\\_2019](https://ashrae.iwrapper.com/ASHRAE_PREVIEW_ONLY_STANDARDS/STD_62.2_2019); *see also* *Residential Indoor Air Quality Guide: Best Practices for Acquisition, Design, Construction, Maintenance and Operation*, [https://www.techstreet.com/ashrae/standards/residential-indoor-air-quality-guide-best-practices-for-acquisition-design-construction-maintenance-and-operation?product\\_id=2016212](https://www.techstreet.com/ashrae/standards/residential-indoor-air-quality-guide-best-practices-for-acquisition-design-construction-maintenance-and-operation?product_id=2016212) (last accessed July 22, 2022).

<sup>136</sup> Zhu, *supra* n.7., at 15.

<sup>137</sup> *See generally* ANSI/ASHRAE STANDARD 62.2-2019: VENTILATION AND ACCEPTABLE INDOOR AIR QUALITY IN RESIDENTIAL BUILDINGS 4 (2019), available at [https://ashrae.iwrapper.com/ASHRAE\\_PREVIEW\\_ONLY\\_STANDARDS/STD\\_62.2\\_2019](https://ashrae.iwrapper.com/ASHRAE_PREVIEW_ONLY_STANDARDS/STD_62.2_2019).

<sup>138</sup> *See* Fabian, *supra* n.20, at 1, 16 (estimating that repairing exhaust fans in low-income, multifamily housing would reduce serious asthma outcomes by 7-12 percent and result in over \$150 in savings for asthmatics annually).

<sup>139</sup> Bambrick et al., *supra* n.124, at 22; Seals & Krasner, *supra* n.83, at 16.

environment.<sup>140</sup> Further, even relatively well-ventilated units exceeded the recommended annual average for PM<sub>2.5</sub>.<sup>141</sup> Accordingly, the study authors recommended not only compliance with ASHRAE Standard 62.2, but also that pollution sources like gas stoves be removed from residences and replaced with electric appliances.<sup>142</sup>

Removing gas cooking appliances from HUD-assisted housing is crucial because even when units are equipped with a properly vented exhaust fans, research suggests that home cooks often do not use them.<sup>143</sup> While HUD, PHAs, and health professionals can and should engage in educational programming to teach residents the importance of using ventilation, education alone cannot make gas cooking safe, especially in the low-income, marginalized communities that HUD primarily serves. Members of low-income communities and communities of color are exposed to especially high levels of nitrogen dioxide and particulate matter outside of their homes.<sup>144</sup> This is due in large part to the U.S. government's historic practice of redlining, which denoted Black and immigrant neighborhoods as risky for mortgage lending and allowed those neighborhoods to be overrun by highways, railways, and other polluting industrial uses.<sup>145</sup> Because outdoor and indoor pollution exposures act cumulatively on a person's risk for disease,<sup>146</sup> these disparities in outdoor pollution levels must be accounted for in housing quality standards that aspire to be protective of human health.

---

<sup>140</sup> NATIONAL CENTER FOR HEALTHY HOUSING, STUDYING THE OPTIMAL VENTILATION FOR ENVIRONMENTAL INDOOR AIR QUALITY 2 (2022).

<sup>141</sup> *Id.* at 3.

<sup>142</sup> *Id.* at 4.

<sup>143</sup> Seals & Krasner, *supra* n.83, at 16; Zhu et al., *supra* n.7, at 6.

<sup>144</sup> Jiawen Liu et al., *Disparities in Air Pollution Exposure in the United States by Race/Ethnicity and Income, 1990-2010*, 129 *Env'tl. Health Perspectives* 127005-1, 127005-12 (Dec. 2021), <https://ehp.niehs.nih.gov/doi/epdf/10.1289/EHP8584>; *see also* Pacheco, *supra* n.88, at 468.

<sup>145</sup> Haley M. Lane et al., *Historical Redlining Is Associated with Present-Day Air Pollution Disparities in U.S. Cities*, 9 *Env'tl. Science & Tech. Letters* 345, 345-46 (March 9, 2022).

<sup>146</sup> Kotchmar et al., *supra* n.64, at 2-61.

Unfortunately, “increasing general ventilation increases indoor [nitrogen dioxide] concentrations from outdoor sources, particularly in urban settings with high traffic.”<sup>147</sup> So, while ventilation may help to disperse pollution from gas stoves, ovens, and cooktops, it also invites the same pollutants from outside sources *into* the home. For HUD-assisted residents living in urban areas with chronic ambient air quality degradation, this problem is nothing new. But, for many, outdoor pollutants infiltrating the home is a growing concern as climate change exposes more and more areas to the persistent risk of wildfire smoke.<sup>148</sup> Thus, to truly reduce the cumulative burden of pollution on vulnerable communities, NSPIRE must increase residents’ ability to ventilate *and* eradicate indoor sources of pollution like gas stoves.

Removing gas cooking appliances from residences is especially necessary in light of research showing that these appliances leak even when they are not actively being used. When residents turn on their kitchen fans or ventilation systems at all, they generally only do so when actively using the gas to cook. Very few people would think to run their ventilation systems constantly, especially as this would be counterproductive for indoor temperature maintenance and preventing outdoor pollutants from entering the home. But, a recent Stanford University study shows that gas stoves leak methane and the other components of gas—which likely include hazardous and even carcinogenic pollutants<sup>149</sup>—*even when the stove is off*.<sup>150</sup> While more research is necessary to understand the precise pollutants of concern, with these increasing cumulative risk factors in mind, it is crucial that HUD use NSPIRE to eliminate controllable pollution sources (i.e. gas cooking appliances), thereby mitigating the effects of those beyond agency control (i.e. wildfire smoke, traffic, and industrial pollution).

---

<sup>147</sup> Fabian et al., *supra* n.64, at 2.

<sup>148</sup> See *generally* First Street Foundation, *Fueling the Flames: The 5<sup>th</sup> National Risk Assessment* (May 2022), available at <https://report.firststreet.org/> (providing specific fire risks for locations throughout the country and describing the increasing risk overall).

<sup>149</sup> See Woolhouse, *supra* n.100 (explaining that gas from four Massachusetts municipalities contained 108 volatile organic compounds, including 27 chemicals considered hazardous under the Clean Air Act, 12 of which are suspected to cause or contribute to cancer).

<sup>150</sup> Lebel et al., *supra* n.105, at 2538 (finding that the majority of gas stove emissions occur when the appliance is in the steady-state-off setting).

**C. NSPIRE must better mitigate fire risk by specifically disallowing gas stoves and allowing induction stoves.**

As HUD’s request for comment acknowledges, space heaters are an unacceptable fire hazard. Just a few months ago, 17 people—most of whom were people of color—were killed in a fire started by a space heater at an affordable housing complex in New York.<sup>151</sup> Thus, PHLC supports HUD’s proposal to include space heaters as a deficiency to reduce the likelihood of fatal disasters like the one in New York. However, NSPIRE should also address other major in-home fire hazards. Eliminating fire hazards from affordable housing to the greatest extent possible is especially important because low-income renters are less able to afford renters’ insurance or the costs of relocation.

At present, the standard for Cooking Appliances permits gas-powered ranges, stoves, and cooktops in home kitchens. As discussed, the primary component of the gas that flows through these appliances is a potent greenhouse gas known as methane.<sup>152</sup> Throughout the supply chain, pipelines that carry gas from underground seams to our homes leak methane into the air.<sup>153</sup> As methane is highly flammable, gas leaks create immediate health risks in the form of fires and explosions.<sup>154</sup> These potentially deadly incidents pose an unacceptable risk to the lives of families and community members residing in HUD-assisted housing. Accordingly, reducing residential reliance on gas wherever possible is advisable. Prohibiting gas stoves through NSPIRE is a simple way to accomplish this goal.

---

<sup>151</sup> Erik Ortiz, *Deadly Bronx Fire Puts Focus on Space Heaters Some See as “Symbols of Inequity”* (Jan. 11, 2022), <https://www.nbcnews.com/news/us-news/symbols-inequity-deadly-bronx-fire-puts-focus-space-heaters-rcna11748>.

<sup>152</sup> Michanowicz et al., *supra* n.57, at 10258.

<sup>153</sup> *See id.*; *see generally* Ramon A. Alvarez et al., *Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain*, 361 *Science* 186, (2018) (describing considerable methane leaks throughout the supply chain); Lebel et al., *supra* n.105, at 2535 (estimating that gas stoves nationwide emit methane equivalent to the carbon dioxide emissions of 500,000 cars annually).

<sup>154</sup> Tan et al., *supra* n.117 at 23 (describing several gas explosions); *see also* BEYOND GAS DC, *Neighborhood Researchers Find Hundreds of Methane Gas Leaks Across DC* (Feb. 23, 2022) <https://www.sierraclub.org/sites/www.sierraclub.org/files/sce/washington-dc-chapter/Methane-Leaks-Across-DC-FINAL.pdf>.

In addition to the explosion risk from gas leaks, the open flames that are the hallmark of gas cooking can cause devastating fires. Unlike electric ranges and cooktops, gas ranges and cooktops rely on combustion to create heat. The resulting flame is a well-known fire hazard, responsible for numerous deaths and injuries and substantial property damage.<sup>155</sup> Cooking fires are “the leading cause of reported home fires and home fire injuries and the second leading cause of home fire deaths.”<sup>156</sup> Unsurprisingly, elderly people, differently-abled people, and children—who comprise a large percentage of HUD-assisted residents—are disproportionately likely to be killed in cooking fires.<sup>157</sup>

While electric ranges have historically carried their own fire risks, this is likely due to outdated electric ranges that do not adequately control heat or alert the user that the cook surface is hot, ultimately causing food or cooking materials to ignite.<sup>158</sup> However, HUD can and should deal with these hazards through NSPIRE as well. First, the Cooking Appliance standard should require that all electric coil cooktops and ranges abide by the UL 858 Standard for Household Electric Ranges. This international standard was designed to keep cooking oil from igniting and to prevent burns from doors, handles and knobs attached to the cooktop, oven, or range.<sup>159</sup> Given that approximately two-thirds of home cooking fires result from the ignition of food or other cooking materials,<sup>160</sup> implementation of this rule would be instrumental in lowering the fire risk associated with electric stoves. Second, the Cooking Appliance standard should require that electric coil ovens indicate when

---

<sup>155</sup> MARTY AHRENS, NATIONAL FIRE PROTECTION ASSOCIATION, HOME COOKING FIRES 1-4 (July 2020) <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/US-Fire-Problem/Fire-causes/oscooking.pdf>.

<sup>156</sup> *Id.* at 1.

<sup>157</sup> *Id.* at 6; see also *Household Oven and Range Standards: Helping to Mitigate the Risk of Burns*, UNDERWRITERS LABORATORIES (June 17, 2021) <https://ul.org/standards-and-engagement/standards-matter/household-oven-and-range-standards-helping>.

<sup>158</sup> Ahrens, *supra* n.155, at 9.

<sup>159</sup> *Household Oven and Range Standards: Helping to Mitigate the Risk of Burns*, UNDERWRITERS LABORATORIES (June 17, 2021) <https://ul.org/standards-and-engagement/standards-matter/household-oven-and-range-standards-helping>.

<sup>160</sup> See Ahrens, *supra* n.155, at 4 (also noting that oil and grease fires were responsible for 58 percent of civilian deaths, 76 percent of civilian injuries, and 77 percent of property damage associated with cooking fires).

they are hot enough to burn via a colored light or other mechanism equally suited to notify the operator that the surface is dangerous. The absence of these elements should be noted as health and safety deficiencies within NPSIRE.

The safest cooking technologies with regard to fire risk are induction cooktops and ranges. Induction stoves negate the need for extra precaution because they can be set to specific temperatures rather than imprecise measures like “high” and “low,” and because they only heat the cookware they are intended to be used with.<sup>161</sup> Induction appliances are also more efficient than even the most efficient gas or resistance heating technologies, and they reduce the energy demand for air conditioners as they do not transfer heat to the surrounding air.<sup>162</sup> Given these major benefits, the Cooking Appliance standard should specifically allow for induction cooking technologies. Currently, the standard allows electric appliances, and while induction appliances are electric, they do not appear to have been contemplated by the standard. For instance, because induction technology only heats the cooking vessel, the standard’s instruction that inspectors wave their hands over the cooktop to assure the appliance is functioning does not make sense. HUD should instead require that inspectors test induction stoves in an appropriate manner, such as by boiling water in a piece of induction cookware.

Although induction technologies are currently slightly more expensive than other electric options, growing interest in these highly efficient technologies is likely to drive down prices and make them an increasingly viable option for low- and moderate-income housing.<sup>163</sup> Additionally, Senator Markey recently introduced a federal legislative proposal that would provide funding for induction

---

<sup>161</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, *2021-2022 Residential Induction Cooktops*, [https://www.energystar.gov/about/2021\\_residential\\_induction\\_cooking\\_tops](https://www.energystar.gov/about/2021_residential_induction_cooking_tops) (last visited July 30, 2022).

<sup>162</sup> *Id.*

<sup>163</sup> See, e.g., Brian Kahn & Lisa Martine Jenkins, *People Want to Electrify Their Lives. These Google Trends Prove It.* (May 10, 2022), <https://www.protocol.com/newsletters/climate/electrification-google-trends?rebelltitem=1#rebelltitem1>.

stoves, ranges, and cooktops.<sup>164</sup> Given rising interest in electrification and high-efficiency appliances, NSPIRE should specifically permit induction cooking technologies.

## V. Conclusion

HUD's efforts to unify, simplify, and strengthen the housing quality standards that apply to federally-assisted housing are a worthwhile endeavor. In particular, adding a moisture detection standard and updating the standards for HVAC systems, Cooking Appliances, and Kitchen Ventilation in the ways described herein would foster meaningful improvements to resident health and wellbeing, especially for vulnerable residents like children and the elderly. Therefore, mindful of HUD's commitment to promoting health and equity, we respectfully ask that HUD amend NSPIRE to reflect these changes, ensuring the standards truly create a decent, safe, and sanitary living environment for everyone.

Sincerely,



---

Dani Replogle  
Staff Attorney  
Public Health Law Center  
Phone: (651) 695-7712  
Email: [Danielle.Replogle@mitchellhamline.edu](mailto:Danielle.Replogle@mitchellhamline.edu)

---

<sup>164</sup> See *Senator Markey Introduces Legislation on Electrification and American Manufacturing for Sustainable, Affordable, and Reliable Home Energy Usage* (May 4, 2022)

<https://www.markey.senate.gov/news/press-releases/senator-markey-introduces-legislation-on-electrification-and-american-manufacturing-for-sustainable-affordable-and-reliable-home-energy-usage> (providing link to text of proposed "ICEE HOT Act of 2022").

Manire Vaughn  
Staff Attorney  
Public Health Law Center  
Email: [Manaire.Vaughn@mitchellhamline.edu](mailto:Manaire.Vaughn@mitchellhamline.edu)

Kyra Hill  
Lead Senior Staff Attorney for Climate Law & Policy  
Public Health Law Center  
Phone: (651) 695-7696  
Email: [Kyra.Hill@mitchellhamline.edu](mailto:Kyra.Hill@mitchellhamline.edu)

Jamie Long  
Staff Attorney  
Public Health Law Center  
Email: [Jamie.Long@mitchellhamline.edu](mailto:Jamie.Long@mitchellhamline.edu)

Kayla Kirtz  
Research Assistant  
Public Health Law Center  
Email: [Kayla.Kirtz@mitchellhamline.edu](mailto:Kayla.Kirtz@mitchellhamline.edu)

Stephanie Lackey  
Digital Communications Specialist  
Public Health Law Center  
Email: [Stephanie.Lackey@mitchellhamline.edu](mailto:Stephanie.Lackey@mitchellhamline.edu)

Anne McKibbin (she/her)  
Principal Director, Policy  
Elevate  
Phone: 312-927-5546  
Email: [Anne.McKibbin@ElevateNP.org](mailto:Anne.McKibbin@ElevateNP.org)