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Residential Site and Community Assessment Tool

Overview

There are many heat stress prevention strategies for farmworkers that focus on correcting either individual behaviors (e.g., avoiding caffeinated beverages and bulky sweatshirts) or workplace conditions (e.g., providing shade and regular break periods). Yet, few heat stress-specific health plans take into consideration the conditions of the built and natural environment that farmworkers are returning to at the end of a long day in the fields.

Climate studies have increasingly shown that summer temperatures are projected to rise considerably in upcoming years (Patz et al., 2005; Schar et al., 2004). Therefore, urban and rural planning must take into account both the housing conditions of vulnerable populations (such as farmworkers) and the potential increased risk for heat stress posed by higher temperatures.

It is important to note that housing affordability is the principal consideration for where farmworkers choose to live. A fundamental need is the provision of low-income housing with living standards that allow farmworkers to cool down and lower their body temperatures after work. This is particularly important for farmworkers living in urban environments where safe, shaded areas may be harder to find or utilize.

This tool was created for use by community organizations, agencies, or residents to identify both community and residential site factors that could increase farmworker’s risk for heat stress illness.
Residential Site and Community Assessment Tool

Overview (con.)

This tool is organized in three parts: residential site assessment factors; community assessment factors; and a checklist for both factors. The residential site factors consider issues that are of importance for heat stress prevention at farmworkers’ residences. The community factors, on the other hand, are support services from the general region that are important for heat stress prevention or treatment.

The checklist can be used as a reference to identify the following information about a specific contributing factor:

- Is this factor present or absent?
- Is it accessible?
- Is it likely to be used?

In addition to the community and residential site factors in this assessment tool, there are other individual risk factors that could contribute to an individual’s risk for heat stress. These include age, gender, job occupation, and existing illnesses (e.g., diabetes, depression, cardiovascular issues). Although these individual factors will not be discussed in this tool, it is important to keep in mind that they could compound the risks for certain individuals.
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The use of cooling devices in the home is an essential element of preventing heat stress-related illnesses. Unfortunately, not all cooling devices were made equally and some provide more effective cooling than others. Similarly, the presence of a cooling device does not mean that it is fully functional or that residents will utilize them.

1.1 A/C Window Units

A/C window units have been shown to decrease indoor temperatures for homes with only one to three rooms (Rogot et al., 1992; O’Neill et al., 1995), but they must be operable to provide cooling benefits. In the farmworker homes we visited, there were several individuals with A/C units that acted as fans rather than producing cool air. There were other units that looked “present” from the outside, but once inside the dwelling it was obvious that the units were broken.
Site Assessment: 1.0 Cooling Devices

1.2 Central Air Conditioning

Studies have shown that working air conditioning can increase positive outcomes for vulnerable individuals during heat waves (Bouchama et al., 2007; Braga et al., 2001; Curriero et al., 2002; Semenza et al., 1996). In the heat wave of 1995 (one of the worst in recorded U.S. history), the majority of deaths were residents who either did not have air conditioning or who did not utilize their air conditioning because of the prohibitive cost (Johnson, 1995; Klinenberg, 2002). During the subsequent heat wave of 1999, the lower death toll in the Midwest (particularly Chicago) was attributed to higher usage of air conditioning (Kovats et al. 2008) combined with access to a new federal energy subsidy program for low-income families and the opening of more cooling centers (Palecki et al., 2008).

However, the presence of central air conditioning does not necessarily guarantee its use, as many people are unable to afford the high utility costs associated with air conditioning. In fact, some authors caution against using air conditioning as the main solution to reducing heat stress risk because of the economic and energy infeasibility of providing air conditioning to everyone during a heat wave (Maller and Strengers, 2011) and the potential for heat produced by air conditioning to increase the urban heat island effect and actually heighten the risk for people in homes without air conditioning (Uejio et al., 2010). Also, there is at least one study that indicates that continuous use of air conditioning can lower a person’s ability to adapt to heightened temperatures and could place them at greater risk to heat stress illness (O’Neill, 2003).
1.3 Fans

Fans have been shown to only slightly decrease the risk of death from heat stress or heat stroke (Bouchama, 2007). In fact, some studies indicate that fans may not provide adequate cooling relief during extreme heat (Kilbourne et al., 1982; Naughton et al., 1999; Semenza et al., 1996) and could even increase the risk for death if they are used incorrectly (Perrin et al., 2006). In effect, fans are useful when they can circulate cooler air, but when they only circulate hot air (as in the case during heat waves), they can elevate skin temperature which can lead to increasing core body temperature (Kilbourne, 2002).
Bouchama et al. (2007) found that visiting cooler outdoor environments increase a resident’s chances at staying safe during peak heat season. Similarly, White-Newsome et al. (2011) discovered that indoor temperatures are generally warmer during peak temperatures than outdoor temperatures.

Yet, fear of crime has been identified as a prime deterrent of urban dwellers seeking relief outside from the heat trapped inside poorly ventilated homes without air conditioning (Changnon, 1996). Therefore, the perceived safety of a neighborhood could increase the likelihood for residents to seek relief in shaded outdoor areas, while the opposite could inhibit residents’ willingness to seek refuge outdoors, thereby increasing their risk for heat distress and mortality (Uejio et al., 2011).
Site Assessment: 2.0 Outdoor Shade

2.1 Shade Trees

In rural farmworker housing neighborhoods, shade trees often do not provide shade for the dwellings themselves, but they are more likely than urban neighborhoods to offer an outdoor space for residents to cool off during peak temperatures. For urban apartments, the residents typically had to rely on spaces apart from their residences for shaded areas.

In our study, one migrant farmworker in an urban setting used a small shade tree on the sidewalk as refuge during the hottest days, but even he indicated that he felt unsafe when he was there and could not fully relax (no matter the time of day).
Site Assessment: 2.0 Outdoor Shade

2.2 Constructed/Improvisational Shade

Despite the lack of natural shade provided in residences, farmworkers often create their own "improvisational shade" through modifications to their residences. The materials used were plastic tarp or mesh fabric. This is an option for those who own trailers in rural environments, but it is mostly off limits to those who rent apartments or houses (with some exceptions).

2.3 Curtains

Without reliable cooling systems, many farmworkers in the study rely on closed curtains to decrease the effect of high temperatures in their homes. The tactic is cost-efficient but is often not enough to substantially reduce the heat felt inside the home.
Ventilation is a key component of reducing risk for heat stress illness. Insulation, on the other hand, can help keep a home cool relative to outdoor temperatures.

### 3.1 Building Materials

In order to assess a building’s sensitivity to heat, scientists have studied a building’s resilience to outdoor temperature, dewpoint (a measure of humidity) and solar radiation. Brick houses were shown to be particularly resilient to all three factors, while homes made of wood and vinyl-siding were more susceptible to changes in all three and tended to have higher indoor temperatures as a result (White-Newsome et al., 2011). Similarly, temperatures in homes built before the 1940s were shown to be more susceptible to outdoor temperature increases, which could be due to lack of adequate insulation or the absence of insulation (Ibid).

### 3.2 Windows

The only farmworkers in our study that felt safe enough to open their windows at night were those on higher floors of apartment buildings. This finding is consistent with other vulnerable populations that fear for their safety in high crime neighborhoods and choose not to open their windows as a result of this fear (Palecki et al., 2001).
Access to clean drinking water is an obvious necessity for everyone, including farmworkers and their families. Most farmworkers in our study either used water from the tap or purchased bottled water.

4.1 Potable Water

Many people assume that all tenants have access to clean drinking water in the United States. Yet, this is not necessarily true, particularly for low-income and marginalized community members such as farmworkers.

4.2 Cool Water

One suggested method for “beating the heat” is to spray yourself with cold water or use a cold towel around your face and neck. However, some farmworkers do not have access to refrigeration in order to cool their drinking water. Likewise, farmworkers without permanent housing must store water jugs in temporary shelters.

4.3 Showers

Heat stress plans also recommend taking a cool shower to cool down body temperature. Again, this presumes that individuals have access to running showers in their homes, which is not always the case.
In our study, the participating farmworkers’ sense of safety correlated with their time spent outdoors: the safer they felt, the more time they spent outdoors. In two cases, there were farmworkers that rarely visited parks located across the street from their apartment complexes because of the crime associated with them.

Community Assessment: 1.0 Cooling Sites

Cooling sites are public spaces where residents have free access to areas that provide cooler temperatures due to technical installments (e.g., air conditioning) or the natural environment (e.g., shade tree). As many farmworkers live in residences without air conditioning or their own shaded spaces, the availability of these public spaces can provide a free alternative.

1.1 Cooling Centers

Cooling centers have air conditioning and water, and they provide free access to community members seeking refuge from high temperatures. Yet, they are not always put to use, as was the case in Chicago during the 1995 heat wave. Residents were not warned of the dangers of the rising temperatures before the heat wave, and there were few community members that took advantage of the five cooling centers within the city limits (Changnon, 1996). Additionally, these sites are only opened in the case of a heat wave.

1.2 Parks

There is ample literature on the physical health benefits of parks (Frumkin, 2001; Hill, 2002). However, as with cooling centers, their presence does not necessarily ensure their use. If farmworkers fear criminal activity in the parks, then they could be deterred from seeking refuge from the heat in those areas.

In fact, in our study, we found that the respondents in rural or suburban areas visited public parks more often than their counterparts in the city, even though the rural/suburban areas had more access to greenery in their immediate surroundings.
Community Assessment: 2.0 Informational Services

The availability and distribution of informational resources on heat stress illness is a critical component of heat stress prevention. There should be both on-going methods to convey prevention techniques and a rapid response plan in the case of an emergency caused by a heat wave.

2.1 Language and Culturally-Appropriate Services

Uejio et al. (2010) have warned of the increased risk for heat stress during a heat wave among individuals in linguistically isolated households (i.e., those that are low/non-English speaking). Emergency information must be available in languages that meet the needs of diverse communities. Similarly, there should be educational materials on heat stress risk that are not only in Spanish (the principal language spoken among farmworkers in California), but that also cater to the unique interests of farmworker families. For example, interviewees in our study suggested using stories with pictures to promote heat stress awareness, instead of using basic, verbose pamphlets that are often discarded as soon as they are given.
2.2 Community Networks

In order to create and disseminate linguistically accessible and culturally appropriate information, there need to be non-profit organizations, community groups, and/or public agencies that are focused on these efforts. Ideally, these networks consist of local people who are familiar with how information is conveyed within the farmworker communities in their area and understand the way to frame issues so that they resonate with the target audience.

The farmworkers in our study made it clear that they simply did not have time during the week to visit social service centers, and none of them had seen any information on health services at frequently visited flea markets. The findings from the interviews suggest that outreach must go to the farmworkers themselves, and service providers should not have an “if we build it, they will come” mentality.

2.3 Community Bulletin Boards

Community bulletin boards, both formal and informal, can be a good way to share information with a wide audience. There are many gathering spots, such as convenience stores, that are frequented by farmworkers on a daily basis, and they provide a low-cost opportunity to disseminate educational information to farmworkers.
The availability of emergency health services for low-income residents is important, but it is particularly critical for populations that are at greater risk, such as farmworkers.

3.1 Hospitals and Clinics

Farmworkers often depend on informal health care methods (e.g., homeopathic remedies or informal massage therapists known as sobadores). However, in an emergency situation, there must be access to formal emergency care at hospitals or clinics.

From our study, the majority of farmworkers we interviewed were familiar with the hospital and clinic in their region that they could visit without health insurance. Yet, only two of them had actually visited one of these facilities and only because they were suffering from intense pain, and in one case, the farmworker had been severely injured on the job. Other farmworkers who suffered from heat stress symptoms declined to visit hospitals and clinics because of the acute fear of the costs associated with that care.

3.2 Fire Stations (or Alternative Care Facilities)

For rural environments, fire stations sometimes serve as a first response location for patients. Since many farmworkers may depend on rides from friends or family in an emergency (instead of calling an ambulance), it is important that these intermediary health care facilities are identified and that this knowledge is available to the larger population.
Community Assessment: 4.0 Transportation

Transportation of heat stress victims can be a major hindrance to receiving rapid treatment. During the peak of the heat wave in 1995, there were not enough ambulances available to transport victims and fire trucks were used as an alternative as necessary (Chicago Sun Times, 20 July 1995).

For farmworkers, the availability of ambulances is not the problem; rather, the problem is the lack of affordable emergency transportation options. Our study revealed that farmworkers can be extremely hesitant to call an ambulance for emergency health purposes because of the high cost. However, many of them do not have their own transportation and are dependent on others for rides. In an emergency situation, friends or family may not be available for rapid transport. Therefore, it is imperative that alternative transportation options be made available to these communities.

4.1 Public Transit

Public transit should be reliable and have stops near emergency health services.

4.2 Jitney/Taxi Services

Jitney services, or low-cost taxi service, could be used to supplement ambulance services.

4.3 Volunteer Car Rides

A volunteer car ride service that could be available in emergencies is an ideal alternative for high cost ambulances.
Community Assessment: 5.0 Urban Heat Island

Urban heat islands are urban areas that typically have higher temperatures than nearby rural or suburban areas. In particular, these areas typically do not cool down at night to the same levels as other sectors and can cause increased risk for heat stress illness and mortality to residents within these warmer areas (Chagnon, 1996; Kovats et al., 2008).

The following items are situations that can decrease the urban heat island effect.

5.1 Housing Density

Many studies have demonstrated that areas with greater open space and more single-family homes distribute cooler temperatures in comparison to denser neighborhoods (Smoyer, 1998; Ratti et al., 2006).

5.2 Lack of Factories

Taha (1997) has shown that the production of anthropogenic heat from factories can greatly increase the temperatures for the surrounding area.

5.3 Green Spaces

The presence of greenery can be influential in reducing the urban heat island effect.


References (continued)


Residential Site Assessment - Checklist

COOLING DEVICES
- A/C Window Units
- Central Air Conditioning
- Fans

OUTDOOR SHADE
- Shade Trees
- Constructed/Improvisational Shade
- Curtains

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