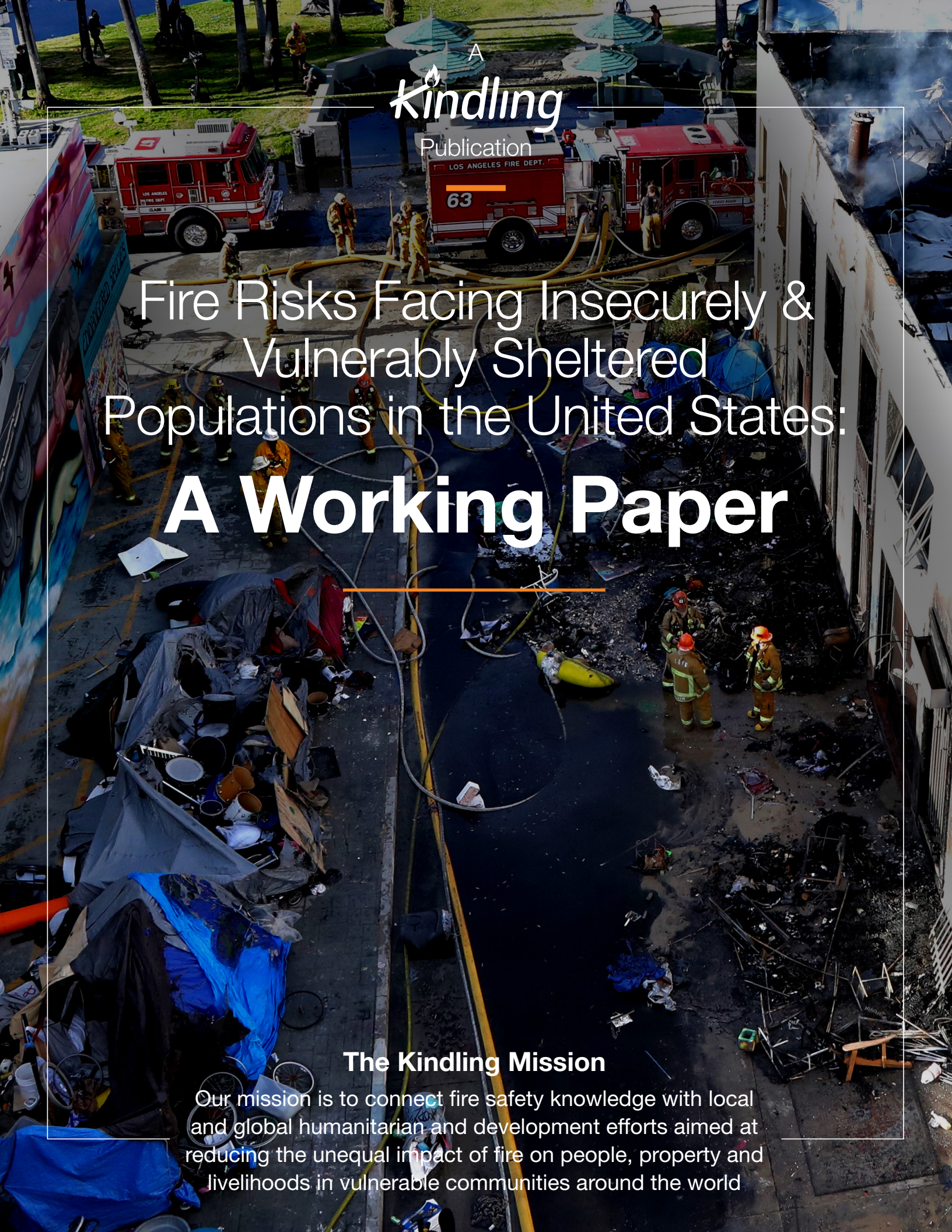

A

Kindling

Publication

Fire Risks Facing Insecurely & Vulnerably Sheltered Populations in the United States:

A Working Paper

The Kindling Mission

Our mission is to connect fire safety knowledge with local and global humanitarian and development efforts aimed at reducing the unequal impact of fire on people, property and livelihoods in vulnerable communities around the world

Contents

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Summary

While the increase in risk associated with social vulnerabilities of persons and communities exposed to various hazards has been broadly studied, in particular for natural hazards, this is not the case for fire, especially for people who are insecurely and vulnerably housed. Much of the data and research regarding building fire risk seems focused on population groups that are housed in nominally code-compliant constructed buildings, meaning the buildings are broadly code compliant, at least at the time of construction. At present, little is known about insecurely and vulnerably sheltered populations living in under-regulated, unregulated, and non-sheltered conditions and experiencing high incidence rates of fire and severe fire consequences in the United States.

A research effort was started in 2021 aimed at understanding the relationship between fire vulnerability of shelters, fire vulnerability of persons in those shelters, the extent to which regulation (construction, operation and maintenance) impacts the fire resilience of the shelter, and how these factors interact. The purpose of this Working Paper is to present an initial framing of these issues, present a taxonomy to begin describing the problem, and to begin to explore the breadth and depth of research and action needed to deeply understand, and ultimately to address fire risk and safety issues experienced by insecurely and vulnerably sheltered populations in the United States.

In this Working Paper, preliminary taxonomies and relationships between shelter type, human and socio-economic vulnerabilities, and fire risk are presented. In the next phase of this project, existing data will be explored in more detail, and a desktop review will be conducted of the policy context of under-regulated and unregulated shelter in the US at the national level and in relation to specific town/city/state case studies (as identified in the literature). Data and policies on homelessness will also be reviewed to develop insights to fire challenges facing populations living in unregulated shelters and non-sheltered conditions. Based on the collective evidence and insights from data collection and analysis, a research roadmap will be proposed to promote a systematic approach to collecting evidence and insights on this complex, under researched area. Recommendations for any policy interventions or other opportunities for practical action to support fire safety improvements will also be shared.

1 Introduction

Fire is not an evenly distributed risk throughout society. It is created through complex interrelationships between environmental, structural, and human factors. [1] Socioeconomic conditions and access to public resources are particularly relevant when considering who and where may be most vulnerable to fire.

As the 2021 NFPA report on *Poverty and the Risk of Fire* highlights, poor and marginalized communities are often exposed to higher fire risks at their homes, work, and in their communities, and they tend to have lower coping capacity to deal with the consequences of fire. [2] Fire incidence varies systematically according to social and economic characteristics of residents, and by housing and neighborhood conditions. [3] [2] Furthermore, coping capacity is often limited by factors such as limited resources, limited access to healthcare, fragile livelihoods, a lack of social and financial safety nets, and a lack of tenure.

In the United States, demand for adequate, affordable housing often outstrips supply. In response to these gaps, people often find or create alternative living arrangements, which may fall outside the purview of state legal systems of land ownership and tenure, and of planning, land use, building and public health and safety regulations [4].

Regulatory mechanisms (e.g., land use planning, building regulations, enforcement capacity) and fire response capacities (e.g., firefighting infrastructure and personnel) are heavily relied upon to achieve fire safety goals in the US. However, institutional capacities (and prioritization) to enforce regulations and invest in public safety infrastructure varies significantly across jurisdictions. Deficiencies in the regulatory system can lead to 'under-regulated' building stock (see Section 3.2 for a definition and examples) and therefore increases in fire incidence and consequences. For example, consider the deadliest fire in Oakland's history, the 2016 Ghost Ship fire which killed 36 people in the old warehouse, an unpermitted living, working and performance space, mainly for local artists. This fire put a spotlight on systemic enforcement issues in Oakland and beyond. It highlighted the need for not only more fire inspectors but also improved inspection processes, including the need for risk-based inspection prioritization, reflective of resource and legislative constraints which prevent regular inspection of all properties. As indicated in Section 3.2 , there is significant diversity in building stock, and occupancy type, and tenure status within the broad category of under-regulated shelter.

The increase in risk associated with social vulnerabilities of persons and communities exposed to various hazards has been broadly studied, in particular for natural hazards. In addition, the intersection of social vulnerability and fire risk has also been explored through research. For middle-high- and high-income countries (MHIC), including the U.S., much of the research seems to be focused on population groups that are housed in nominally code-compliant constructed buildings, meaning they are broadly code compliant, at least at the time of construction. Less research is available regarding fire risks to insecurely and vulnerably sheltered populations. While there is some research into fire risks of insecurely and vulnerably sheltered populations in low- and middle-income countries (LMIC), especially in relation to informal settlements it is evident that exploration of similarly sheltered persons in MHIC is lacking, including in the US. This is despite that large sectors of the U.S. population live in under-regulated, unregulated, and non-sheltered conditions, and experience high incidence rates of fire and severe fire consequences. For example, the Los Angeles Fire Department reported that fires related to homelessness occurred at a rate of 24 fires per day, making up 54 percent of all fires the department responded to in the first quarter of 2021. [5]

In general, housing informality is closely related to fire risk. It is not determinative of risk, but an interaction with environmental, neighborhood, social, economic, demographic characteristics, and health can help explain discrepancies in fire losses. Understanding the nature of informal housing is important for several reasons, not least of which is the ability to identify measures to improve fire safety across the range of existing housing. Traditionally thought to be a feature of development in rapidly urbanizing LMICs, the phenomenon of fire among informally or vulnerably sheltered populations is becoming recognized as a feature of American urban areas. [6] Fires in informal settlements consisting of tent encampments, recreational vehicles, and other improvised housing is widely reported in both large cities and smaller urban places across the country. Some of these incidents cause casualties [7] [8], disruption of normal activity in larger urban centers [9], spread to adjacent infrastructure [10] [11] [12], spread to wildlands and adjacent communities [13], and other social and economic harm.

The broad purpose of this research effort is to better understand the relationships between fire vulnerability of shelters, fire vulnerability of persons in those shelters, the extent to which regulation (construction, operation and maintenance) impacts the fire resilience of the shelter, and how these factors interact. By defining and framing these matters, this research effort aims to discover the breadth and depth of research and action needed to understand and ultimately address fire safety issues of insecurely and vulnerably sheltered populations in the United States (i.e., populations living in under-regulated, unregulated, or non-sheltered conditions; see Section 3.2).

This Working Paper aims to communicate the project approach and to share preliminary taxonomies and insights to the relationships between shelter type, human and socio-economic vulnerabilities, and fire risk.

2 Research Questions

The first stage of the research study has been focused on mapping existing evidence and knowledges in relation to fire risk exposure of insecurely and vulnerably sheltered populations in the United States. This evidence gathering stage has been guided by the following research questions:

- What are the characteristics of robust, fire safe and resilient housing / shelter?
- What is an appropriate definition of ‘vulnerably-housed’?
- Is there an existing vulnerability framework that can be used to guide this effort (e.g., social vulnerability index or other)?
- What are the social, cultural, and economic characteristics / attributes that can be used to describe / define vulnerability to fire for those without access to physically robust and fire safe housing / shelter?
- What are the technical, operational, and regulatory characteristics / attributes of buildings / shelters that make them less safe / higher risk in terms of fire performance as compared with physically robust and fire safe housing / shelter?
- Are their built-in biases in rental, sales, lending and related policies, practices and procedures that contribute to fire-vulnerable housing, and in particular, for what groups, and in what ways?
- Are there relationships between social and environmental inequities and fire-vulnerabilities, and if so, what are the relationships, what can be learned, and can multi-benefit mitigation / support / rectification policies be possible?
- How are people who are temporarily unhoused accounted for?
- How many people in the USA might be considered ‘insecurely and vulnerably-housed’?

- What data, methods, policies, practices, and procedures might be needed to address the fire 'insecurely and vulnerably sheltered' challenges?

Literature reviews on the following topics are being carried out on key aspects of the research questions, including:

- The relationship between fire risk, fire safety and socioeconomic conditions
- Human vulnerabilities to fire
- Housing typologies in the US (regulated and unregulated)

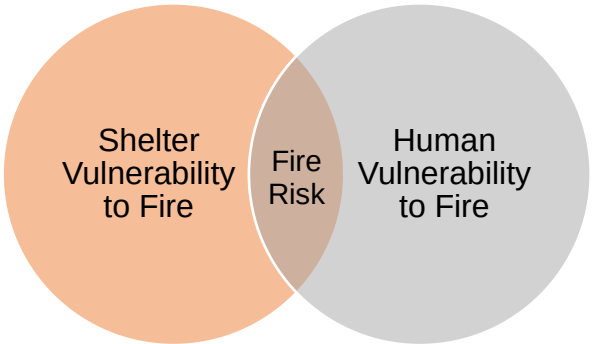
3 Initial Framing of the Problem and Needs

This section shares preliminary framing of the problem and research needs based on the initial review of literature and relevant data/databases, as well as the draft definitions for key terms, shelter typology characterizations, and social vulnerabilities through the lenses of fire risk and fire safety.

3.1 Definitions

Exploration of the complex and often reinforcing interactions between shelter vulnerabilities to fire and human vulnerabilities to fire underpin this research.

- **Insecurely and vulnerably sheltered populations** – People living in unsafe conditions (to fire) due to the combination of their own specific vulnerabilities and their shelter vulnerabilities caused by interrelated and often systemic issues. For the purposes of this study, populations living in under-regulated, unregulated, or non-sheltered conditions are considered insecurely and vulnerably sheltered (see Section 3.2).



- **Shelter vulnerability to fire** – unsafe conditions to people, their livelihoods and / or property due to inappropriate or ill-maintained construction and/or fire safety systems.

- **Human vulnerability to fire** – lack of capacity to respond or recover from fire and its effects due to individual, household or community's circumstances, experiences, and capacities, shaped by demographic, physical, mental, social, cultural, institutional, economic, and environmental factors (or processes)

The following fire resilience terms are inspired by the United Nations Office for Disaster Risk Reduction resilience definitions. [14]

- **Fire resilient shelter** – a shelter that, when exposed to a credible fire event, has the ability to resist, absorb, accommodate and recover from the effects of that fire in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

- **Fire resilient occupants** – persons who, when exposed to a credible fire event, have the ability to resist, absorb, accommodate and recover from the effects of the fire in a timely and efficient manner, including physically, mentally, emotionally and financially.

3.2 Shelter Vulnerability to Fire

Housing (in)formality can be considered along two dimensions – according to its regulatory status, and according to its tenure. For the purposes of this work, shelter is considered in the following broad categories:

- **Vulnerability-Protected**: Goes beyond minimum aspect of building code and includes provisions aimed at protecting vulnerable populations in one or more attributes of vulnerability.

- **Minimally Compliant**: Meets building code requirements at time of construction and are maintained to meet that level throughout their lifetime.

- **Under-Regulated**: May have met building code at time of construction, or not, and are inadequately maintained, have insufficient fire protection, may have illegal components, may be abandoned, etc., and persons use the space for temporary or permanent shelter. Examples include under-maintained buildings, uncertain tenure situations, and illegal conversion/subdivisions.

    - *Under-maintained*: this describes the situation of a regulated building falling into neglect due to an owner unwilling or unable to address maintenance issues. This can occur with owner occupied or rented housing. For example, some properties may be abandoned by owners, or they may fail to appear in court to respond to enforcement measures, resulting in long delays in correction of violations

    - *Insecure tenure*: this describes housing within an otherwise legal unit, but with mechanisms such as illegal sub-leases or extra occupancy beyond the legal framework of tenancy between owner and resident.

    - *Illegal conversion/subdivision*: this includes the conversion of commercial or industrial spaces to residential uses, as well as illegal subdivision of formal dwelling units into smaller spaces, often at the expense of egress, access to utilities, and space. Included within this category are conversion of parts of regulated premises, such as basements, into housing units outside of any regulatory process.

- **Unregulated**: informal structure built outside of regulatory control; temporary materials and methods of construction may be used to provide minimal protection from some environmental effects; construction offers little or no fire protection; insecure tenure is common. Examples include tents, tarps, lean-to's, motor vehicles, shacks.

- **Non-sheltered**: No significant form of shelter, consisting of open sleeping, possibly with bedding or other cover (e.g., bridge, doorway, awning) for minimal protection against weather conditions. This is the lowest level of housing security.

The shelter categories and their conceptual relationships are shown in Figure 1.

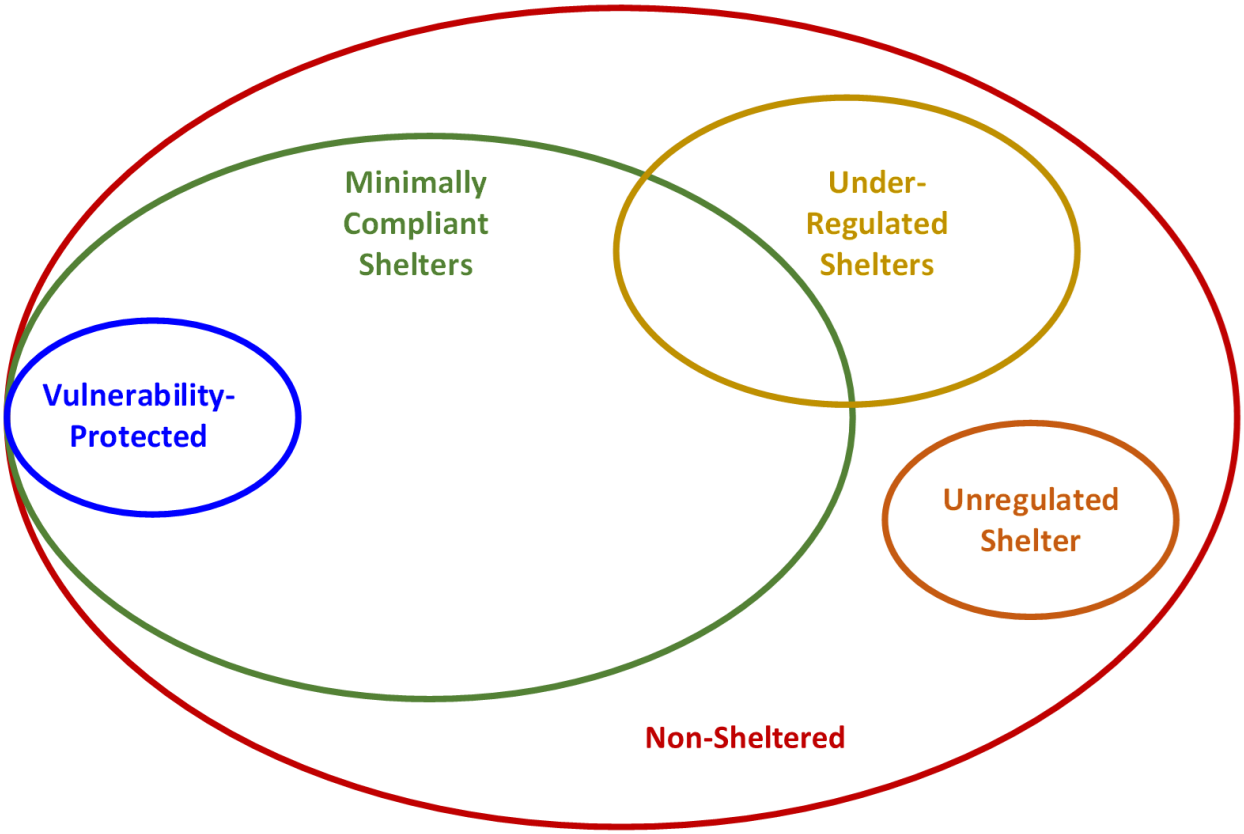


Figure 1: Conceptual representation of shelter categories

Within the under- or unregulated accommodation, there are also areas of considerable overlap and complexity. Enforcement mechanisms are largely market-driven, with property owners responsible for maintaining or bringing property up to legal minimum standards by the local Authority Having Jurisdiction (AHJ). But in reality, chronic, long-term problems of property maintenance and abandonment contribute to deterioration of housing quality. Housing regulation presumes a stable, legal pattern of ownership and tenancy. This regulatory system exists based on norms of conduct, and when these norms are breached, opportunities for proliferation of unsafe or less safe housing can be created, even within structures ostensibly subject to regulation.

Illegal conversion/subdivision is a gray area in most regulatory systems. The size of this market is not well known. Recent experience shows that this portion of the housing market is both tolerated by regulators, and a wide swathe of municipalities are in various stages of developing and implementing schemes for legalization of some of this housing stock. As an example, New York City has a large stock of illegal basement apartments that exist outside any formal regulatory process. Estimates place as many as 100,000 informal units of all types within New York City [15].

While advocates have pushed for legalization options, the flooding following Hurricane Ida resulted in 11 of 13 New York City drowning deaths in basement apartments, many of them illegal [16]. A subsequent report by the City calls for establishing a list of basement apartments (implying legal tolerance) and developing a comprehensive basement apartment conversion program [17].

Another share of regulated illegal conversion/subdivision housing includes use of non-residential structures for residential purposes. Often these units may not comply with egress and life safety requirements.

In the realm of illegally constructed dwelling units, a New York *Times* article describes a garage converted into a 1100 sq. ft. dwelling in the back yard of a more modest house. The article describes this portion of the housing market as a "*shadow inventory of unpermitted housing that has swelled across Los Angeles and other high-priced cities as affordable housing shriveled. Amateur developers build them for profit. Homeowners build them for family or to help with the mortgage."* [18].

In the area of improvised housing, fire safety concerns dominate due to the lack of fire resistance, insecure tenure, and often, proximity to other improvised housing which increases risk of fire spread across multiple units, and heightened risks of crime, violence, unsafe or irregular heating or cooking operations. Such settlements can include collections of tents, vehicles used for shelter, informally constructed shelters, often with accumulations of storage and combustibles in close proximity.

Lastly, improvised temporary housing includes totally non-sheltered circumstances such as sleeping outside without a tent, use of rudimentary bedding, or crude shelters such as cardboard boxes or crates. A major threat to these housing arrangements includes intentional attack, in which bedding is set alight [19], or ignition of bedding materials or clothing.

3.3 Human Vulnerability to Fire

Although the US housing is widely formalized, elements of human vulnerability to fire transcend formal/ and informal contexts. Human vulnerabilities to fire can influence human behavior and may therefore contribute to fire risks and increased vulnerability to fire effects. For example, it has been found that **security fears** influence the escape capacity of people living in informal settlements, since crime prevention measures such as locks with multiple keys can extend the escape time. This evidences security concerns being higher than consequences of being trapped fire incident. [20]

It is important to look at **fire data** to determine when fires are most prevalent. For example, when fires occur at nigh-time when occupants are likely sleeping, their response time is prolonged, making it more difficult to escape in time. **Lack of lighting** and therefore visibility and lack of **evacuation lifts** for residents with poor mobility are other examples of potential obstacles for safe evacuation.

In the literature, **socio-demographics** and **socioeconomic status** are often indicators of vulnerability or capacity to respond to hazard. Most broader disaster risk management methodologies incorporate a vulnerability and capacity assessment approach (e.g. [21] [22] [23] [24] [25] [26]).

Broadly, human vulnerability has been considered on a country wide scale, enabling the identification of certain regions which may require greater support.

Age & Gender: children and elderly are associated with limited mobility, making evacuation difficult. The resources needed to care for the wellbeing of children and elderly may also disadvantage their finances and / or work opportunities. Evidence also shows that females are more vulnerable to disaster effects because of their economic status and often greater responsibilities caring for family [27] [26]

Race & Ethnicity: language barriers and existing prejudice may pose a challenge to employment opportunities, access to support post fire [27] or prevention measures before the fire.

Socioeconomic status: often correlated with income, which in turn is related to educational attainment leading to better financial stability - which is where most exposure to knowledge of physics or fire risks (i.e. even through office fire safety training or drills) could be gained; in addition acquiring fire prevention measures (i.e. fire blankets, fire alarms, fire extinguishers, etc.) as well as recovering lost possessions is more challenging for people with lower income

The **contribution of the community** to capacity to respond to hazard may also have a significant role in providing capacity post-fire through shelter, support in cash and food. More information is needed whether this type of community support is typical or present within insecurely and vulnerably sheltered populations in the US.

Overall, examining **existing efforts / frameworks** to quantify resilience may provide guidance on key metrics and themes to consider.

3.4 'Shelter – Fire Risk – Human' Vulnerability

There are many characterizations of fire risk, including to people, property, operations, and the environment. For some, the conceptualization and definition of fire risk focuses on the likelihood of fire occurring (e.g., the risk of fire in this building is X), while for others it relates to the likelihood of harm to people given a fire (e.g., the risk to life from fire in this building is Y), monetary loss (e.g., the expected cost of fire in this building is Z), or other. Contributors to the fire risk vary as much as the conceptualizations, e.g., potential sources of ignition, potential fuels, targets and their vulnerabilities to fire effects, etc.

In this work, the focus is on understanding the relationship between fire vulnerability of shelters, fire safety vulnerability of persons in those shelters, the extent to which regulation (construction, operation and maintenance) impacts the fire resilience of the shelter, and how these factors interact. In Figure 2, we consider fire risk as an indicator of the likelihood of a potentially harm-inducing (self-sustaining) fire occurring, fire resilience as a reflection of the robustness of a shelter given a potentially harm-inducing fire (inverse of vulnerability), and the resulting risk to life from fire of occupants of the shelter.

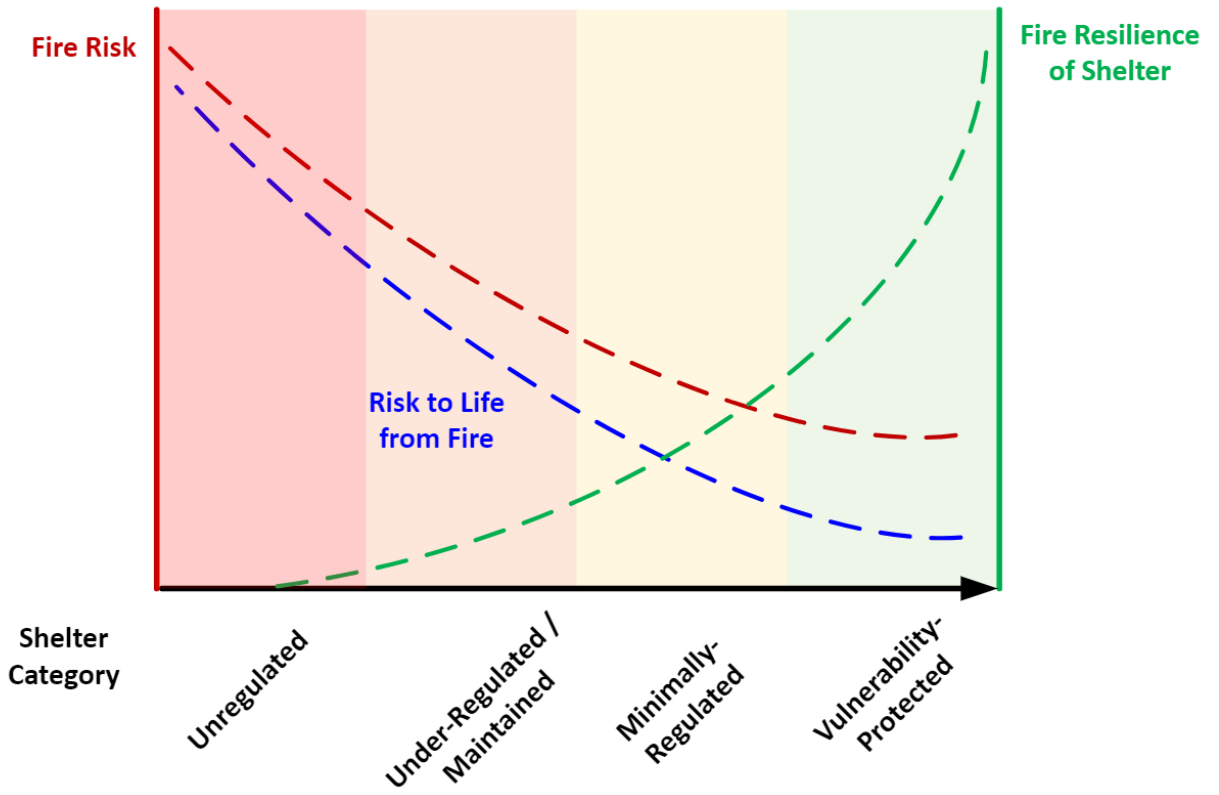


Figure 2: Fire Risk – Risk to Life from Fire – Fire Resilience curves as a function of shelter categories

On the left (Y) axis is fire risk, which decreases from left to right indicating unregulated shelters are exposed to higher levels of fire risk than other shelter categories. In other words, as formality, regulated nature, and maintenance of shelters increases (X axis), fire risk decreases. On the right (Y) axis is fire resilience, which increases from left to right, being the lowest for unregulated shelters and the highest for vulnerability-protected shelters.

The 'non-sheltered' category is not shown in this graph because fire risk exposure is driven more by interactions with the surrounding environment than by shelter characteristics. Not to be confused with the non-sheltered category in this study, the U.S. Department of Housing and Urban Development (HUD), refers to someone as being 'unsheltered' if a person's primary nighttime location is a public or private place not designated for, or ordinarily used as, a regular sleeping accomodation for people (e.g., streets, vehicles, parks). In relation to this study's shelter categorization, this means 'unsheltered' populations may seek refuge in shelters which are unregulated or under-regulated, or sleep in the open as per the 'non-sheltered' category described in Section 3.2.

The primary purpose of fire safety regulations in the United States is to promote and maintain life safety of occupants. The blue line indicates risk to life from fire, which decreases from left to right indicating unregulated shelters are exposed to the higher levels of risk to life from fire than the other shelter categories. There is a strong relationship between risk to life from fire and fire risk - they are interrelated. Regulatory mechanisms that prioritize life safety drive fire safety investments therefore reducing fire risk overall. Vulnerability-protected shelters go beyond regulatory requirements and include features that provide additional protection for one or more vulnerability attributes (e.g., could be enhanced fire protection features, enhanced evacuation features, care givers, etc.).

Much is known / published on risk to life from fire associated with minimally regulated (i.e., code-compliant buildings, since building and fire regulations are minimum standards) and vulnerability-protected spaces. Some is known about risk to life from fire in some under-regulated, including under-maintained shelters (e.g., older, formal, once minimally regulated construction), but not other areas. Very little is known about risk to life from fire associated with unregulated and non-sheltered populations.

3.5 Data Insights & Data Gaps

Obtaining reliable data or estimates of the fire problem among insecurely and vulnerably sheltered populations is a challenge. There are multiple existing data sources that may offer potential for better defining the magnitude of the problem.

There is a clear relationship between homelessness, non-sheltered and unregulated living situations, and heightened fire risks. It is therefore relevant to consider homeless populations in this study, and to consider national statistics of homelessness. The definition of 'homelessness' itself is an area of inquiry and further research is needed to explore data sources and gaps through this project. Nevertheless, the HUD annual homeless assessment report for Congress provides a high level overview of the scale and nature of homelessness in the United States. [28]

In 2020, the headline finding of this report was that homelessness was increasing even prior to the Covid-19 pandemic; 2020 was the fourth consecutive year of increases in homelessness. On a single night in 2020, roughly 580,000 people were experiencing homelessness in the United States (about 18 of every 10,000 people in the country); 61 percent of people experiencing homelessness were sheltered, meaning they were staying in emergency shelters, transitional housing programs, or safe havens. The remaining 29 percent of people experiencing homelessness were 'unsheltered' (as per HUD definition described in Section 3.4). The majority of all people experiencing homelessness (58.9%) were in urban areas, whereas nearly a quarter (23.6%) of people experiencing homelessness were in suburban areas, and the remaining 17.5 percent were in rural areas. More than half of all people experiencing homelessness were in four states – California, New York, Florida, and Texas. [28]

Vacant and abaonded buildings provide diverse types of unregulated and underregulated shelter. In 2011-2015, U.S. fire departments responded to an estimated average of 30,200 structure fires per year in vacant properties. These fires resulted in an average of 60 civilian deaths, 160 civilian injuries, and $710 million in direct property damage per year. Many properties are vacant during changes of ownership/occupant and are not abandoned. Fires in vacant buildings are more likely to have been intentionally set and to spread beyond the building than are fires in other structures. They also cause a disproportionate share of firefighter injuries. [29]

However, the absence of universal definitions of vacancy and abandonment complicates efforts to assess the number of vacant and abandoned properties nationally. The best aggregate sources include the U.S. Census Bureau and the U.S. Postal Service, although these are not without limitations, such as the latest relevant data being from 2010/2011. Using these sources, the U.S. Government Accountability Office (GAO) reported in 2011 that vacant residential units, not including those used seasonally or by migrant workers, increased from 7 million in 2000 to 10 million in 2010. The Joint Center for Housing Studies of Harvard University reported that a subset of this category, homes vacant and not being marketed for sale or rent, reached a record high of 7.4 million in 2012, with increases concentrated in the high-foreclosure areas of the South and West. Although vacant homes can be found throughout the country, they tend to be concentrated; nearly 40 percent of the nation's vacant homes are in just 10 percent of all census tracts. More

than half of the census tracts with vacancy rates of 20 percent or higher were in just 50 counties, most of them in metropolitan areas. Wayne County in Michigan and Cook County in Illinois, for example, each have more than 200 high-vacancy neighborhoods. In addition to the many vacant and abandoned residential properties across the nation, estimates place the number of brownfields — idle former industrial properties with real or perceived environmental contamination — at approximately a half-million. [30]

The broad range of housing types and circumstances involved in fires and casualties among insecurely and vulnerably sheltered populations will likely require multiple data sources and additional analytic steps due to gaps within existing data systems. As an example, reconciling fire-related burn injuries typically requires using both the National Fire Incident Reporting System (NFIRS) and National Center for Health Statistics data to capture burns that may result from fires that are not reported to the fire service.

The collection of comprehensive data on insecure and vulnerable shelters and their populations is complicated. Vulnerable housing includes both building stock and characteristics of the resident or occupants proximate to the fire. Existing fire incident data systems do not capture or define the socioeconomic circumstances of the property owner or occupier (e.g., data on physical and mental abilities, age, gender, educational attainment, income, ethnicity, family structure among others), the maintenance or upkeep status of the property (beyond vacancy), or characteristics of the environment (tent fire on a campground versus under a highway bridge). Information on a fire in an illegally subdivided apartment would likely be indistinguishable from a code-compliant, new dwelling. The lack of such data has required the use of neighborhood characteristics to make inferences about socioeconomic characteristics (e.g., local crime rates, community cohesion among others) and building stock characteristics and fire risk within the literature. The potential for collection of expanded data could greatly enhance our understanding of fire risk generally, and among insecure and vulnerable shelters and their populations.

4 Next Steps

The project will complete a literature review on aspects of fire risk for the insecurely and vulnerably sheltered (i.e., populations that are non-sheltered or occupy buildings that are unregulated or under-regulated). The feasibility of measuring the magnitude of the fire problem among this population will also be assessed by surveying existing data sources at the federal level, as well as identifying locally based efforts and opportunities to systematically track the problem.

A desktop review will be conducted of the policy context of under-regulated and unregulated shelter in the US at the national level and in relation to specific town/city/state case studies (as identified in the literature). Data and policies on homelessness will also be reviewed to develop insights to fire challenges facing non-sheltered populations and populations living in unregulated shelters. The project will elaborate on theories and typologies representing the complex and varying dimensions of this aspect of the fire problem in the United States.

Based on the collective evidence and insights from data collection and analysis, a research roadmap will be proposed to promote a systematic approach to collecting evidence and insights on this complex, under researched area. Recommendations for any policy interventions or other opportunities for practical action to support fire safety improvements will also be shared.

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