



# Language access in emergency and disaster preparedness: An assessment of local government “whole community” efforts in the United States

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## ABSTRACT

In 2011, the United States Federal Emergency Management Agency enunciated a “whole community” strategic approach to emergency and disaster preparedness. Central to this approach is inclusion of the interests and concerns of all residents of a jurisdiction, including those with heightened vulnerabilities. However, relatively few studies have investigated how subnational governments have translated those federally-identified principles of access and inclusion into practice. Here, we ask: what is the current state of local government performance on language access, what might explain it, and what are its implications? While limited English proficiency (LEP) is both a key vulnerability indicator and important to emergency preparedness and operations, it is seldom studied systematically. We investigate how language accessibility is addressed in two distinct elements of community preparedness: emergency operations plans (EOPs) and household emergency preparedness guides (HPGs). Using a sample of 110 U.S. counties, we find somewhat positive performance: nearly half the counties score high on language access in their EOPs, and two-thirds acknowledge the issue. Local HPGs are moderately language accessible. But our analysis also indicates that underlying demand (proportion LEP residents, community hazards profiles) does not correspond to specific efforts. Rather, other aspects of local administrative capacity might drive performance variation. Taken together, this suggests a policy challenge: emergency preparedness on language access remains relatively variable across U.S. communities and might depend primarily on local capacity and commitment. The findings imply uniform adoption of whole community principles in emergency preparedness actions across the U.S. is unlikely to occur reflexively.

## 1. Whole community emergency management: assessing performance

The Hurricane Katrina disaster in 2005 had a number of important consequences for emergency management practice in the United States (U.S.), including prompting the Federal Emergency Management Agency (FEMA) to seek to improve performance across all phases of the emergency management cycle [1,2]. Several years of internal review and assessment at FEMA yielded a new national strategic statement promoting the importance of a “Whole Community” approach to emergency management practices [3]. Central to the approach is its emphasis on inclusive preparedness efforts. In this context inclusiveness refers to meaningful participation of all community stakeholders, including those who might be at high levels of risk, or most vulnerable, to the adverse effects of hazards [4–6].

An emphasis on access and inclusion is important because it shifts

discourse from longer-standing notions of consequence management to a more proactive stance seeking to understand, assess and prepare for the needs of those community members most vulnerable to hazards risk. This includes the elderly, children, people with disabilities, those with fewer economic advantages, and those with limited English proficiency (LEP). Focused attention to the needs of all members of a community represents something of a departure from past practices in the U.S [7]. Explicit identification of the need and value of inclusiveness in emergency management practice both re-shapes the general public’s expectations for what appropriate emergency management entails and provides a rationale and incentive for key administrators in government agencies to assess performance in terms of meeting the needs of the most vulnerable. Thus, as a doctrine, FEMA’s whole community strategy statement represents a contribution to a potential paradigm shift in the basic processes of emergency management.

However, contemplating the possibilities attendant to such a shift

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also raises important questions of what whole community emergency preparedness might look like in practice, of what constitutes effective performance given this strategic emphasis, and of how such policy and practice guidance might be implemented by subnational government agencies given the complexities of the U.S. federal governance structure. We tackle these topic areas by considering how language accessibility has been addressed through local government disaster preparedness efforts in emergency planning processes and in educational engagement with the general public.

Language access, in the context of disasters and other crises, refers to the ability of individuals to engage in written and oral communications that permit comprehension and exchange of information relevant to emergency preparedness and emergency response systems, resulting in greater safety for individuals and in an overall risk reduction for affected communities (see Ref. [8]). Inadequate language access has been found to be a recurring source of individuals' social vulnerability, leading to disproportionate damage and loss to populations with LEP in disaster [9, 10]. As such, assessing language access in emergency preparedness is one means of understanding the application of whole community principles. Our research approach here is to ask the following: what is the current state of local performance on emergency preparedness for language access service assistance needs across U.S. communities? What factors might explain this current state of performance? And what are its implications for an overall understanding of the subnational adoption of FEMA's whole community strategic approach?

In this paper we provide a content analysis of key documents reflective of two key elements of emergency preparedness: internal planning processes (county government emergency operations plans (EOPs)) for incident management and external public engagement through general education (household emergency preparedness guides (HPGs)). Our document analysis permits inferences about the degree to which U.S. local governments have adopted and utilized whole community principles in emergency preparedness in the area of language access. Likewise, it allows for assessment of regional and intrastate performance variation along with the possible effects of underlying service assistance demand (as indicated by the proportion of LEP need in a county and by natural hazards exposure in a county) on language access efforts.

## 2. Language access, social vulnerability to disaster, and local government performance

To understand the relationship between language access issues and emergency preparedness, it is useful to recognize that while hazards are natural or technological, a disaster is a social phenomenon, in part a function of collective human actions [11,12]. Among other things this means that the adverse effects of a disaster are not distributed evenly across identifiable groups within a community, which calls attention to the idea of social vulnerability to disaster. Social vulnerability can be defined as unequal exposure to risk across various social categories, reflective of social and governance systems that produce social inequities [13]. Likewise, the idea of access and functional needs refers to specific issues of integrating effectively individuals with physical, developmental, or intellectual disabilities, chronic conditions or LEP into hazards planning, emergency communications systems and other emergency services in order to reduce risk and promote community resilience [14,15].

Research in this domain emphasizes that individuals' susceptibility or exposure to hazards is the joint product of proximate risks, socioeconomic forces, and other social and political influences that together either aggravate or attenuate vulnerability levels [14–16]. Recognition of the implications of social vulnerability to hazards and disasters has led to more specific explication of its various dimensions, including access and functional needs considerations [17,18], heightened risk for children and for people with disabilities [17,18], economic status [19, 20], differential access to social capital [21,22] and, race and gender

inequalities [23,24].

This study focuses on language access because it represents a critical indicator of social vulnerability to disaster [9] and as such is a useful metric to examine whole community principles in application. Limited language proficiency is a key barrier to individuals' integration in a community politically, socially, and economically [25,26]. The integration barrier is heightened during emergency or crisis situations which require individuals be able to access, comprehend and respond to critical information and communications. Prior research indicates limited language proficiency has adverse consequences in terms of injury, property damage, economic loss, and loss of life during disaster incidents and recovery periods [27–29]. For instance, Post-Katrina assessments have noted that many undocumented immigrants were unaware of the danger of Katrina and failed to evacuate in part because of LEP [29]. More recently, the 2017 Grenfell tower fire in London presented a case where some non-English speaking victims were trapped in the building and lost their lives because building evacuation guidance was unclear or not translated [30].

Beyond the individual-level, addressing language access effectively is a nontrivial task at an organizational level as well. Prior research has found that challenges associated with language translation undermine the effectiveness of humanitarian organizations' assistance delivery in post-disaster settings [31]. Likewise, explicit policy and governance choices addressing variable levels of vulnerability rooted in the capability to understand and communicate in the primary language in the place of their residence has received relatively little attention across various national systems [8]. Importantly, despite the role of language access for individuals' disaster preparedness and response and its implication for government performance in disaster, in the case of the U. S., relatively little is known about how state or local government agencies incorporate language access in emergency preparedness or response operations.

We approach this knowledge gap by examining how local governments in the U.S. perform when following relevant strategic guidance set forth by FEMA. As noted above, in 2011 FEMA adopted a whole community strategic approach which in part emphasized the importance of inclusive preparedness efforts. Even prior to that guidance document, Executive Order 13166 [32] identified explicitly the need to increase access to services for persons with LEP as a broader effort by the federal government aimed at ensuring civil rights protections and equitable treatment of all citizens. More recently, in 2016, building on the recognition of language proficiency as a dimension of social vulnerability to disaster, FEMA also published a Language Access Plan guidance document [33]. That planning statement provides guidance of language access service provision to state and local governments in order to ensure equitable and fair treatment to all citizens and other residents during an emergency or disaster.

While these actions are all situated at the federal government level, it is essential to recognize that in the U.S. federal system local governments have primary responsibility for emergency management and key related operational activities, such as emergency first response, mitigation planning, long-term disaster recovery, and so forth [34,35]. Our primary substantive interest here is in local governments' emergency preparedness efforts. Preparedness is defined in the National Incident Management System ([36]; p.67) as "a continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action in an effort to ensure effective coordination during incident response." Thus, preparedness has a number of elements and can be thought of as a mission area that is comprised of its own internal processes—which falls within the broader emergency management cycle.

Local government performance on emergency preparedness with respect to incorporation of whole community principles can be assessed in a variety of ways—but documenting the specifics of a key internal planning process is one useful measurement approach. Examining local emergency planning is useful precisely because those efforts are

organized around identifying major hazards to which a community is vulnerable as well as what impacts might occur and what are the geographical areas most at risk [37]. Such efforts serve as a foundation for other elements within the preparedness cycle. Therefore, we consider the extent to which protocols and other details specified in a county EOP explicitly pertain to language access—as a means of understanding how language-related vulnerability is being addressed with a local jurisdiction. In light of the importance of community emergency preparedness, additionally we investigate HPGs to understand how local emergency management offices engage with the general public. This external engagement (as opposed to internal planning processes) involves a community outreach process designed to educate individuals and encourage household-level readiness for emergencies and disasters [14]. HPGs represent a key tool of external outreach aimed at public education in support of preparedness; they are most effective when tailored to the specific needs of a local population. Previous assessment has shown that engaging the general public effectively requires understanding and adjusting to their informational needs. For instance, a generic approach to emergency communications has often failed to provide appropriate and feasible instructions to persons with specific access and functional needs [38].

### 3. Assessing language access in practice: data and methods

#### 3.1. Data

To assess local emergency preparedness efforts by investigating EOPs and HPGs, we sampled a total of 190 U.S. counties in order to provide a broad national perspective. Our sampling strategy proceeded in two stages. First, we developed our sample based on a language statistics package of American Community Survey (ACS), titled "Detailed Languages Spoken at Home and Ability to Speak English for the Population 5 Years and Over: 2009–2013" [39]. The ACS language dataset tracks language usage in counties that: (1) have 100,000 or more total population and (2) have 25,000 or more speakers of languages other than English and Spanish. Motivated by the increased racial, ethnic and

linguistic diversity across the country and their potential vulnerability to disaster, our research aims to capture a broad range of language diversity. The broader perspective on language diversity is well aligned with FEMA's "Whole Community Approach" inclusive of all that might be vulnerable to hazards. The ACS dataset serves the purpose of our study and is therefore used as a baseline for constructing the sample. The first stage sample frame constructed included 155 counties: 120 counties with a minimum of 500,000 residents; and 35 counties with lower population levels but a presence of high racial and linguistic diversity.

Second, to avoid oversampling larger counties based on the ACS language information, we expanded our sample frame by matching the 35 less populated counties in language dataset with another 35 counties from the 2011–2016 ACS data. Those lower population counties were matched on a one-to-one basis based on geographical location, population, and racial diversity. In the end, we obtained a sample frame of 190 counties for data collection and analysis. Fig. 1 shows the geographical distribution of our sample frame. The frame represents effective spatial diversity, population size diversity and variation in the proportions of LEP speakers within individual county jurisdictions.

To collect EOPs, we identified documents available online or direct requests to the sampled county emergency management offices; for agencies where EOPs are not made available to the public, Freedom of Information Act requests were made. The data collection process took place from December 2017 to June 2018 resulting in a final sample of 110 EOPs, accounting for 58% of original sample frame. Appendix A provides distribution details by state and region. Of the 110 EOPs collected, 97 were enacted after 2012 (about 88%), which suggests the EOP documents assessed capture effectively current local emergency operations planning efforts across the U.S. As for the HPGs, to permit comparability in analysis we included only counties where EOPs had been obtained. Of those, 100 out of 110 counties made their HPGs available online for analysis (Ten counties did not have a stand-alone website permitting HPG dissemination in an online format). In addition to the EOPs and HPGs, we also collected the following three pieces of profile information for each sampled county: (1) language diversity information from the 2009–2013 ACS multi-year survey, (2)

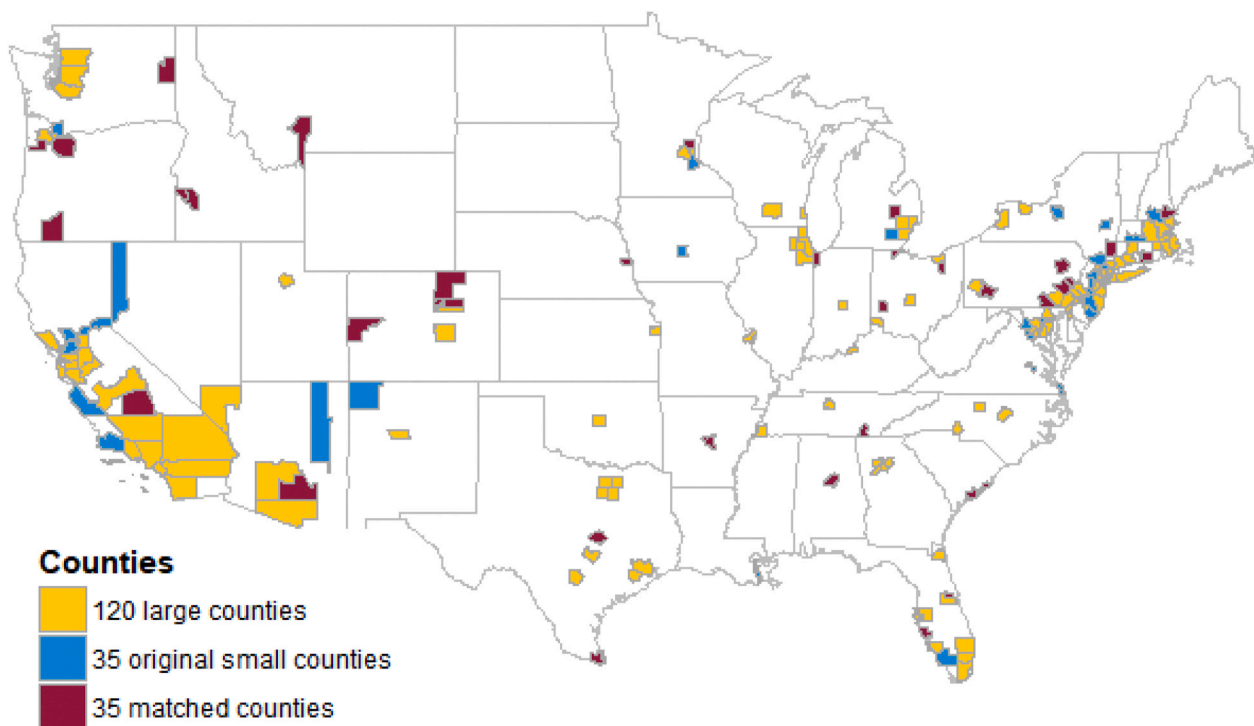


Fig. 1. Geographic distribution of the sample frame.

Note: Of the 190 counties in the sample frame, 56 were from Northeast, 28 from Midwest, 51 from South and 55 from West.

demographic information from 2011 to 2016 ACS survey; and (3) information about counties' previous hazard losses and experiences with high impact disasters from Spatial Hazard Events and Losses Database for the United States (SHELDUS) database from 2007 to 2016 [40].

#### 4. Methods

Our assessment approach was to conduct a content analysis of the county-level EOP and HPG documents and conduct additional basic analytic tests of several key questions about possible sources of variation in the measured content of those documents. The content analysis approach permits comparison and valid inferences about local governments' emergency preparedness performance through a set of systematic procedures [41]. It also permits examination of underlying meaning of a text through quantifying the written language according to a set of criteria [42]. Coding the HPGs was straightforward. We first identified whether a county emergency management office provides HPG material on its public website; the guides were coded as to whether they were available in languages other than English, and if so, what language options were provided.

To code the EOPs, we proceeded as follows. First, we developed a common coding protocol, which included a list of key terms relevant to language service provision and the criteria for identifying and scoring the meaning of information relevant to language access. The list of terms is presented in Table 1 below. Using the key word list and their variants, we extracted and organized all the content potentially relevant to identifying how language access needs might be addressed in a county EOP.

Second, using the identified content, each EOP was assigned a performance score from 1 to 4 based on following criteria. A value of "1" indicates the EOP did not mention language access issues at any point in the document. A value of "2" indicates the EOP did note or recognize language access needs, but provided no discussion or details identifying or explaining any operational activities associated with provision of language access services related to emergencies or disasters. A value of "3" indicates the EOP not only made note or mention of language access needs in the community, but also outlined some form of a process or procedure to address such needs. And finally, a value of "4" indicates that not only did the EOP recognize language access needs and provide process details in how those needs might be addressed in a process or operational sense, the planning document also went so far as to specify either a responsible organization or responsible personnel tasked with carrying out operations in providing language access services. In this way we developed scoring system that reflects a continuum ranging from no mention to specific assignment of a responsible party in the emergency response operations protocols. In terms of inter-coder reliability, the research team went through three rounds of coding checks; the process achieved an acceptable Cohen's kappa of 0.80 [43]. Table 2 summarizes the operational definition and provides brief illustrations of the evidence used in assigning each collected EOP into one of the four categories.

**Table 1**  
Search terms for content coding of county EOPs.

Key terms	Variants
English	English, English-speaking, non-English
Spanish	Spanish, Spanish-speaking
Language	Language, lingual, linguistic, linguistically
Translate	translate, translation, translator, translating
Interpret	interpretative, interpreter, interpretation, interpreting
Vulnerable	vulnerable, vulnerability, vulnerable population/individuals
Access and functional needs	functional and access needs, special needs population
ADA/Civil Right Act	Americans with Disabilities Act, ADA, ADA-compliant, Civil Rights Act

**Table 2**  
Definition and illustration of EOP performance coding.

Category	Operational definition	Illustrative examples – Text from EOPs	Coding Rationale
1	EOP included no mention of language diversity and the associated needs	No key search terms found	Empty set; language access not addressed in the EOP
2	EOP recognizes language access needs, but had no discussion of operational or other process issues	In a section "Populations with disabilities and other access and functional needs", a county EOP from CA states "individuals in need of additional response assistance may include those who ... have limited English proficiency" or are "non-English speaking"; In a "Situation and assumption" section, a county EOP from MD states "the county will make a reasonable effort to warn hearing-impaired and non-English speaking persons"	Although language access needs are identified as a relevant issue for emergency management, the EOP provides no further discussion on processes designed to address the needs.
3	EOP notes language access needs and references to processes/procedures to address those needs are present	In a section "Protective Shelter", a county EOP from NE states "Inspection and selection of potential shelter sites and assuring that the facilities can support special needs individuals, including non-English speaking persons"; the county also made similar statements in the section on health and human services. In the "Planning factors City/County of –" annex, the county plan states "There are functionally vulnerable populations at risk in –. These people may require special considerations in warning, evacuation, and other areas of disaster response".	While the EOP describes relevant processes generally, it lacks precisions on operational details and/or lacks responsible parties designated for task implementation
4	EOP noted language access needs, provided operational details and designated responsible organizations or personnel tasked to implement service provision	Another county EOP from CA states in a "public information and alert" section, (the county needs) to warn all non-English speaking; hearing, visually or mobility impaired persons; and other special needs populations of the emergency situation/hazard by: Using bilingual employees whenever possible;	EOP offers a detailed and comprehensive processes for addressing language access needs and demonstrates clarity in specifying task implementation to designated parties

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**Table 2** (continued)

Category	Operational definition	Illustrative examples – Text from EOPs	Coding Rationale
		translating all warnings, written and spoken, into appropriate languages; contacting media outlets (radio/television) that serve the languages you need; Utilizing video phones and 9-1-1 translation services to contact the deaf and hard of hearing and using pre-identified lists and NGOs to reach populations with Access and Functional Needs"; it specified duties for health branch director as "coordinate with care and shelter branch and American Red Cross for the care of people with access and functional needs (PAFN); Coordinate with the Medical/Health Branch for sheltering of residential care and populations that may have access and functional needs, i.e., persons needing communication assistance". The county plan also similarly specified responsibilities for sheriff sergeants, county executive officer staff, sheriff staff etc.	

## 5. Analysis and results

To reiterate, several overarching questions guide our analysis: How can local emergency preparedness performance be characterized across local governments in the U.S.? What factors might help explain any variation in performance? And what do those efforts suggest about the adoption of federal guidance on achieving whole community preparedness by those subnational governments? Direct answers to these questions are presented below.

**Table 3**  
Distribution of EOP performance scores: Total and by region (row %).

Score	1	2	3	4	Total
Count	37	25	18	30	110
Percentage	33.6%	22.7%	16.4%	27.3%	100%
Midwest	7 (46.7%)	1 (6.7%)	3 (20.0%)	4 (26.7%)	15 (100%)
Northeast	3 (12.0%)	4 (16.0%)	9 (36.0%)	9 (36.0%)	25 (100%)
South	12 (42.9%)	10 (35.7%)	3 (10.7%)	3 (10.7%)	28 (100%)
West	15 (35.7%)	10 (23.8%)	3 (7.1%)	14 (33.3%)	42 (100%)

### 5.1. Language access and preparedness performance: emergency operations planning

As a starting point for understanding the current state of emergency preparedness and language access in the U.S., [Table 3](#) displays the EOP score distribution discussed in the preceding section. As a broad characterization of performance by subnational governments, the results are fairly positive. About 44% of county EOPs scored in Categories 3 and 4, which indicates that a local EOP has either a process to address language access or has a specifically-identified responsible party for doing so. Further, when including Category 2, which represents at least an explicit acknowledgment of community language access needs in an EOP, then about 66% of the sampled counties address community language access needs in some form. As mentioned above, provision of language access services in an emergency or disaster setting is a nontrivial operational challenge of expertise and resources. Thus, the adoption and utilization of federal guidance on access and inclusion on this specific question of language services—even if only acknowledging the issue as a matter of concern to community emergency operations—suggests fairly strong subnational progress toward a whole community approach in operational practice.

[Table 3](#) also reveals important information on regional differences in EOP scores. For example, the table shows counties in the Northeast and West have higher proportions of scores in category 4 than those in the Midwest and South, suggesting a somewhat higher level of whole community principles adoption in those regions. Due to the non-normality of EOP score distribution, we conducted Kruskal-Wallis H Test to assess if median EOP scores are the same for all four U.S. regions [44]. Our results indicate meaningful, i.e. statistically significant, differences across the four regions ( $\chi^2 = 10.1$ ,  $DF = 3$ ,  $p = 0.02$ ). A closer examination through pairwise comparisons reveals the Northeast ( $M = 2.96$ ,  $SD = 1.02$ ) and South ( $M = 1.89$ ,  $SD = 1.29$ ) exhibit significantly different performance (at the high and low ends of the distribution, respectively).

A second indicator of the current state of language access practices and emergency preparedness, we gathered information on whether standard HPGs—a type of “external” public engagement as opposed to EOPs as an indication of preparedness effort “internal” to a county government—were made available in languages other than English. [Table 4](#) shows that of 100 counties having their stand-alone websites for the emergency management offices, 90% made HPGs available online, and of those, 33% were available in at least one language other than English, with Spanish being the most common. Some locations went

**Table 4**  
Local HPGs available online: Availability in English and Non-English versions.

	HPG Available Online	Only Available in English	Available in Additional Languages: Spanish	Available in Additional Languages: Spanish and at least one other	Total
Yes	90	57	13	20	90
No	10	33	87	80	10
<b>Regional Breakdown of Available HPGs (i.e. “yes”):</b>					
Midwest	14 (15.6%)	11 (19.3%)	3 (23.1%)	0 (0%)	14
Northeast	13 (14.4%)	8 (14.0%)	0 (0%)	5 (25%)	13
South	27 (27.9%)	16 (28.1%)	4 (30.8%)	7 (35%)	27
West	36 (40%)	22 (38.6%)	6 (46.2%)	8 (40%)	36

#### Notes.

- 100 counties had emergency management websites; 10 counties did not. Column percentages for guide availability broken down by region (i.e. the “yes” counts) are shown in parentheses.
- Additional languages included in the HPG differ by counties. Examples include Chinese, Japanese, Hindu, Russian, Arabic, Haitian Creole, Italian, French, Somali, Tongan and etc.

beyond Spanish to incorporate translation in extensive lists of languages. For example, in Los Angeles County, CA, its HPG is also available in Arabic, Armenian, Chinese, Farsi, Khmer, Korean, Russian, Spanish, Tagalog, Thai, Vietnamese, Japanese, and Hindu. Table 4 provides a break-down of possible regional differences. Performing a simple Kruskal Wallis test reveals no statistically significant differences in HPG dissemination ( $\chi^2 = 1.63$ ,  $DF = 3$ ,  $p = 0.65$ ) based on region, however.

We further investigated a possible association between the internal (EOPs) and the external (HPGs) indicators of preparedness performance. It seems reasonable to expect that counties with strong language accessibility in EOPs might also be proactive in reaching out to LEP communities through their HPG materials. However, a Chi-square test found no statistically significant relationship present between these measures:  $\chi^2(3, N = 110) = 1.650$ ,  $p = 0.648$ .

## 5.2. Intra-state variations in preparedness performance

Beyond broad regional differences, we also consider possible intra-state variation in language access service provision for LEP individuals. The question is relevant because of the potential effect of state government on the emergency and disaster preparedness of local governments, including guiding and assisting local government's emergency program development and channeling federal guidance to communities [45,46]. In this particular setting, state governments can affect local preparedness efforts in several ways, such as by providing EOP templates, by offering technical assistance when EOPs are drafted or by enunciating standards criteria. State governments vary on these instrumental issues, however. While local compliance with state-level government guidance is not a focus of this study, we are interested in whether local governments within the same state are likely to have relatively consistent preparedness performance in the area of language access.

Most of our sample, 76% ( $n = 29$ ), consists of states with four counties or less (see Appendix A). As a result, we choose four states for examination of this question: California, Florida, Maryland and Washington. These states have a relatively larger number of observations (five or more counties) and are geographically dispersed. The four states also offer variation in hazard profiles and linguistic diversity in terms of proportions of LEP speakers. Table 5 provides a summary of county performance on EOPs and the availability of HPGs in non-English languages.

The results in Table 5 show nontrivial intrastate variance across all four states on both EOP scores and the availability of HPGs in languages other than English. For instance, in Florida, two-thirds of EOPs are below a score of "3"; in California, 42% of EOPs ( $n = 8$ ) are scored as a "4" while the other 58% of EOPs ( $n = 11$ ) are "2" or below. In Maryland and Washington, the EOP scores are spread fairly evenly across the full range of the measurement scale. As for HPGs, about 37% of California counties offer HPGs in languages other than English, while in Florida it is 56%, 40% in Maryland, and 20% in Washington state.

The results indicate substantive intrastate variation—but because of sample size limitations, we cannot offer parameter testing. However, details provided in county EOPs aid in understanding exactly how counties differ in their attention to language access issues. For example, in California, one EOP mentions "the county has a culture rich in its history and ethnic diversity with over 100 languages and dialects

spoken" in an overview section of the document. However, while acknowledging language diversity, the EOP makes no mention of actual language access needs in the community and offers no operational mechanisms to address possible assistance needs. By comparison, an EOP in a peer county (similar size and demographics) in California notes individuals "having limited English proficiency or are non-English speaking" as an access and functional need and makes explicit that "... local organizations shall provide services to specific groups of people, including non-English speaking ...". Similarly, another county in California that had an EOP score of 4 stipulates explicitly the use of various channels to provide information in multiple language and identifies the responsible units and their tasks for the implementation:

"[The county] needs to warn all non-English speaking; hearing, visually or mobility impaired persons; and other special needs populations of the emergency situation/hazard by: Using bilingual employees whenever possible; translating all warnings, written and spoken, into appropriate languages; contacting media outlets (radio/television) that serve the languages you need; Utilizing video phones and 9-1-1 translation services to contact the deaf and hard of hearing and using pre-identified lists and NGOs to reach populations with Access and Functional Needs."

That same county EOP also specifies the duties for major department heads in emergency response. For instance, the responsibilities for health branch director include "coordinat[ing] with care and shelter branch and American Red Cross for the care of people with access and functional needs (PAFN); Coordinate with the Medical/Health Branch for sheltering of residential care and populations that may have access and functional needs, i.e., persons needing communication assistance."

We also examined the content of state EOPs to see to what extent counties directly borrow languages from state plans. We found divergence between state and county EOPs, implying county EOPs do not necessarily model state EOP language. State-level agencies do not always provide precise guidance on these matters. For instance, in Florida's *Local Comprehensive Emergency Management Plan Compliance Criteria*, the state only asks local governments to include non-English speaking populations in counties' demographic profile. There is no further requirement or concrete action items to address language access needs in the state's Compliance Criteria. However, we observe that some Florida counties not only specify their actions to address language access needs in their EOPs but also designate responsible units for these actions. Similarly, Washington has no mention of language access needs or communities with limited English proficiency in its state EOP. However, four of the five counties in our sample from Washington do address language access, to varying degrees at least.

## 5.3. Preparedness performance and underlying demand for language services

Table 3 through 5 indicates nontrivial variation across the U.S., including both regionally and within states. This calls attention to our third area of inquiry: determinants of performance variation.

Drawing from the policy adoption literature, one prevailing approach in explaining this type of observed variation is an internal determinants model. That approach proposes political, economic, and social characteristics internal to a jurisdiction drive a jurisdiction's adoption of a new program or policy [47]. Equally important, another relevant internal characteristic is a jurisdiction's underlying motivation to action [48], which largely depends on problem severity demanding attention and investment [49,50]. Here, using such a logic, it is reasonable to assess whether the potential demand for language access services in a county jurisdiction when experiencing a hazard serves as a motivation to improve language access in emergency preparedness actions. Thus, we consider: (1) the portion of LEP residents in a county, and, (2) hazard exposure as germane indicators of potential language services demand in a county. Linguistic diversity in a jurisdiction represents underlying service assistance demand in an emergency or

**Table 5**

Intra-state variations of preparedness performance in CA, FL, MD and WA.

	EOP Score (counts)				Non-English Guide (counts)		N
	1	2	3	4	Yes	No	
California	6	5	0	8	7	12	19
Florida	0	6	1	2	5	4	9
Maryland	2	2	1	0	2	3	5
Washington	1	1	1	2	1	4	5

disaster context. We use two measures of language diversity to measure assistance demand: percentage of the county population that does not speak English well and proportion of foreign-born residents<sup>1</sup>.

The first measure—percentage of the county population that does not speak English well—is drawn from the 2013 ACS language dataset and includes only the largest and most linguistically diverse counties ( $N = 91$ )<sup>2</sup>. In addition to that, we also included the percentage of foreign-born population<sup>3</sup> from the 2011–2016 ACS data for the entire sample ( $N = 110$ ) as a second measure of underlying demand. Table 6 shows the means and standard deviations of these two language diversity measures across the four categories of language accessibility for county EOPs.

The distribution shown in Table 6 does not support a straightforward demand-based explanation, i.e., a positive relationship between linguistic diversity in a county and emergency operations planning performance. Given the indicator—“not speaking English well” in a household—violates ANOVA’s assumption of the homogeneity of variance, we conducted a Welch’s ANOVA test [51]. The result suggests that not all the mean percentages of LEP populations were equal across four EOP categories,  $F(3, 46) = 46, p < 0.01$ . The pairwise comparison shows that only counties in category 3 ( $M = 8.07, SD = 3.56$ ) and 4 ( $M = 14.22, SD = 8.27$ ) have significantly different proportions of LEP populations. When using the foreign-born population as the indicator of language diversity, we cannot rule out the possibility that mean proportions of foreign-born populations are the same across four EOP categories,  $F(3, 57) = 2.02, p = 0.12$ . In sum, these test statistics indicate a county’s degree of language diversity does not determine EOP language access performance.

In terms of external engagement efforts with the general public, counties providing non-English HPGs ( $M = 13.25, SD = 8.46$ ) do have higher percentages of populations that do not speak English well compared to those counties offering HPGs in English only ( $M = 10.60, SD = 5.11$ ). But these differences are not statistically significant,  $t(39) = 1.54, p = 0.132$ . When considering the foreign-born population measure, we find counties with HPGs available in multiple languages ( $M = 22.40, SD = 12.72$ ) have statistically significantly higher levels of language diversity than counties who only offer HPGs in English ( $M = 17.15, SD = 8.51$ ),  $t(47) = 2.15, p = 0.04$ . This finding suggests some potentially meaningful relationship between demand and provision of HPGs.

In addition to language diversity as an indicator of motivation and underlying demand for local action on and issue, a county’s prior experiences with hazards is considered here. The disaster preparedness literature shows that organizations with higher exposure to disaster in the past are more likely to make preparations for future disasters [52–54]. This comports with a finding from Burby and May [55] that localities with disaster experiences engaged in more effective preparedness efforts than those without recent hazard incidents. Given more efficacious plans result from inclusive planning processes [56], it is reasonable to expect a positive relationship between a county’s hazard experiences and its preparedness efforts in addressing language access needs. We used two indicators to capture a county’s prior relevant hazard experience: presidential disaster declarations (PDDs) and property damage per capita during a previous time period. The first measure, presence of a PDD, indicates a county’s experience with a large-scale, high-impact extreme events. The property damage per capita, as a

hazards loss measure, permits quantification of the economic impact of previous hazard incidents. As hazard occurrences vary across years, we calculated 10-year averages from 2007 to 2016 for these two indicators and used mean measures for analysis. Table 7 provides this distributional information.

Table 7 indicates that counties with higher EOP language access scores neither have experienced a greater number of large-scale disasters nor have they had higher property losses per capita. In considering presidential disaster declarations, the Kruskal-Wallis H Tests did not reveal any statistically significant difference the EOP performance categories. For hazards losses per capita, significant differences did exist ( $\chi^2 = 16.00, DF = 3, p = 0.01$ ). Better preparing counties seemed to suffer less from previous hazards, as counties in category 2 ( $M = 10.03, SD = 37.27$ ) had lower levels of property damage than counties in category 1 ( $M = 22.38, SD = 38.32$ ), but had higher levels compared to counties in category 3 ( $M = 9.69, SD = 13.42$ ). This finding contradicts an assumed relationship of counties with prior adverse experience with hazard incidents producing EOPs with greater attention to language access—which we treat here as a general indication of attention to access and function needs in a jurisdiction. One possible alternative explanation is that previous hazard losses might actually compromise county governments’ capacity to plan for access and functional needs—though this is speculative and requires far more extensive analysis.

Regarding the relationship between prior hazards incident experience and public engagement, a simple  $t$ -test reveals that while per capita hazards losses is larger in counties with English-only HPGs ( $M = 15.51, SD = 29.47$ ) compared to counties offering multiple language HPGs ( $M = 9.86, SD = 35.35$ ), the difference is statistically insignificant,  $t(55) = -0.79, p = 0.431$ . When using the PDD this non-significant result still holds,  $t(51) = -0.37, p = 0.716$ .

## 6. Discussion

In discussing the results we have presented, we would like to begin by acknowledging three limitations of this study. First, our sample is reliant on the ACS language database in considering languages spoken in a household and the ability to speak English well. Although use of the dataset allows us to measure a range of language diversity, reliance on the ACS database does orient an examination toward larger and, typically, more demographically diverse counties. Among the 110 EOPs, 75 are from counties with more than 500,000 populations. With larger counties, our findings might overstate the attention that language access services receive across the U.S. federal system; larger counties tend to have greater administrative resources and perhaps more likely to face linguistic diversity considerations. Counties with smaller populations, but still with socially vulnerability concerns, such as a county with a sizeable proportion of LEP residents (e.g. a lower population and/or rural county with a significant Spanish-speaking population) are not well-represented in the study. Second, our analysis of county-level performance only considers EOPs and online HPGs. Other mechanisms for accessing language access services, such as 211 call centers or other in-person communications during emergency or disaster incidents, are not examined here. Third, while we have sound measures of underlying

**Table 6**  
Language diversity distribution across EOP scores.

EOP Score	Not Speaking English Well (%)		Foreign Born (%)	
	M	SD	M	SD
1	10.68	5.67	17.3	9.78
2	11.45	5.29	18.9	8.85
3	8.07	3.56	15.94	5.42
4	14.22	8.27	22.17	12.59
N	91	91	110	110

**Table 7**  
Hazard experience distribution across EOP scores.

EOP Score	10-year Average Number of Presidential Disaster Declarations		10-year Average Property Damage Per Capita (Adjusted to 2016 \$)	
	M	SD	M	SD
1	0.58	0.46	22.38	38.32
2	0.53	0.31	10.03	37.27
3	0.78	0.35	9.69	13.42
4	0.67	0.52	7.45	15.33
N	92	92	110	110

demand for language access, we do not offer other measures of the internal determinants model for policy adoption. Because the analysis finds very little or impacts from the key demand indicators in terms of language diversity and disaster exposure, a reasonable inference is that performance on language access might be related to factors such as local administrative capacity and commitment.

Despite these limitations, the analysis presented here offers unique insights into whole community preparedness through examination of its application in the specific area of language access. The findings present a complex picture of whole community ideals in practice. The counties in our sample indicate performance in the aggregate on internal emergency operations planning is quite promising. A relatively high proportion (67%) of the sampled EOPs acknowledge the language access needs—and nearly half (about 44%) offer a high degree of specificity in terms of operational responsibilities aimed at promoting language accessibility. However, at the same time our findings indicate less robust performance in terms of public education or outreach, as less than a third of the sample (30%) provide HPGs in another language online.

Our results also demonstrate notable regional differences and meaningful intra-state variation in county-level preparedness performance. Our comparison of county efforts in California, Florida, Maryland and Washington indicate local initiative in addressing social vulnerability in a community matters a great deal; the variation in performance indicates local efforts are not simply a function of state-level guidance.

The findings also provide initial insight into potential drivers of the local variation in performance. Our findings suggest that underlying demand is not correlated, in general, with either internal planning performance or external outreach performance, with two exceptions of note. One is when using foreign-born population as the indicator, counties with higher language diversity do seem to exhibit stronger public engagement performance (i.e. more accessible HPGs). And that might just be a function of power difference since foreign-born population has 19 more observations than the other indicator (a measure of people in a household “not speaking English well”). The other exception is when using property damage per capita as the indicator for hazard experience, we note a negative relationship with internal planning performance. This contradicts a presumed positive relationship assumption between demand for inclusive and comprehensive planning, and actual planning performance. But overall, this analysis does not seem to indicate a simple need-response relationship drives local actions on language access—and thereby suggests that other efforts to address the needs of socially vulnerable groups in a community might also vary based on factors other than underlying community demand.

If county governments' emergency preparedness efforts in meeting language access needs are not a function of either state-level guidance or an underlying demand for the services, what else might account for the performance variation observed here? One candidate explanation seems plausible: the degree of local administrative capacity and commitment. Our finding that two preparedness performance indicators—internal emergency operation planning and external public engagement—are not correlated with each other suggests that some counties, even being aware of local language access needs, might not be able to take actions to address the concerns. Various county EOPs do acknowledge linguistic diversity as a key community characteristic, but at the same time make no mention of steps to address language access needs. Robust administrative capacity and commitment (i.e. expertise and leadership) in a local emergency management agency might well explain why we can observe a community with a relatively low proportion LEP residents still scoring high (e.g. a “4” on our scale) in terms of their preparedness efforts. Of course, the converse might also be true. Insufficient local administrative capacity might also explain the negative association between local performance and property damages from previous hazard incidents, which might compromise subsequent emergency preparedness efforts. This candidate explanation would align with the findings in policy adoption in general, and in areas such as environmental planning.

Policy scholars find that capacity level or relative availability of resources, including financial resources, administrative capacity, leaders' commitment, and technical expertise affect local policy adoption choices and/or implementation efficacy [57–59]. A county government with greater fiscal capacity is likely to be more capable of devoting efforts to identifying community linguistic profiles, hiring more bilingual or multi-lingual staffs, and devoting staff to develop more comprehensive approaches to addressing disaster vulnerability in a community. In terms of emergency management specifically, local governments with lower revenue-generating capacity face the challenges of lacking resources and staffing for emergency preparedness functions [46,60–62]. For example, in assessing local hazard mitigation plans, it has been demonstrated that local officials' commitment and agency capacity (budget, staff, expertise, and authority) were critical to robustness of plan content [55].

## 7. Conclusion

FEMA's adoption in 2011 of a whole community strategic approach to enhancing community resilience and promoting greater risk reduction efficacy through greater inclusiveness represents an important step toward improving performance in emergency and disaster management. How well such an effort translates to direct practice is an important and necessary question to ask. The analysis we present here indicates that such a challenging endeavor is not likely to result in uniform adoption across a complex federal system. Further, a basic need-response matching on language access does not appear to produce greater attention to language access issues. By inference, other access and functional needs issue might similarly face uneven preparedness actions at a local level.

Our paper offers three broader contributions. First, there are relatively few systematic assessments of the degree to which subnational governments have implemented whole community principles into direct operational activities (exceptions such as [1,5,7]). Even with the certain empirical limitations we have noted, this study helps fill such a gap. The empirical assessment we provide likewise helps serve as a basis for future tests of the utilization of whole community principles. Second, by focusing on language access—one critical but seldom studied area of social vulnerability—our paper contributes to the social vulnerability literature by assessing empirically local government emergency preparedness efforts. Third, this study also provides insights in understanding challenges of policy implementation in a federal system. The inter- and intra-state variation shown is important per se in understanding the challenge of adopting whole community preparedness across a complex federal system in the United States. Our analysis also prompts a related question: to what extent is policy demand or local administrative capacity critical to policy implementation in the broad domain of emergency and disaster management? Or to put it another way: in the specific mission area of emergency preparedness, is an underlying policy demand likely to drive local performance—or is performance primarily a function of local capacity (commitment, leadership, administrative staffing resources)? Relevant studies to this question suggest a basic need-response matching might be likely [63–65]. But at the same time, our results here seem to underscore the inherent complexity of the matter. In line with previous studies emphasizing the importance of administrative capacity, further examination of the determinants of whole community preparedness performance at the local level is warranted as a means of understanding emergency and disaster preparedness more completely.

Lastly, in addition to those contributions, there are at least two substantive implications for policy and practice in the emergency management domain. First, we find basic underlying demand does not seem to drive robust attention to an access and functional need such as disaster vulnerability rooted in LEP. The lack of clear demand-response matching suggests that key emergency management staff will benefit through proactive engagement with community constituencies to better



understand community-specific access and functional needs issues. To do so requires agency staff commitment to routine community engagement in regular planning processes, public awareness campaigns, and broader community risk reduction strategies. This implies nontrivial resource commitments by a county-level agency, but the analysis here suggests that such engagement is imperative to effective risk reduction through whole community engagement. And the more routine such engagement become, the more effective local preparedness processes come. Second, from a practical operational standpoint, addressing language access as a formal requirement in routine vulnerability assessment processes and hazard mitigation action strategies would benefit national systems overall. Doing so can be understood not simply through a risk reduction lens but as a resilience capacity promotion mechanism as well. In the U.S., such a requirement is not formalized, but doing so would offer the benefit of more robust and efficacious preparedness actions, both in terms of internal planning processes and external public engagement.

## 8. Notes

- 1 Another indicator for language diversity we considered is percentages of (county) population speaking other language at home. However, it is strongly correlated with Not Speaking English Well ( $r = 0.970$ ,  $p < 0.001$ ), so we only kept one.

- 2 As noted, the ACS language dataset only contains the language information for the counties with large populations and with smaller population levels but a presence of high racial and linguistic diversity. The dataset does not contain the information of 19 counties which were later matched to the lower population counties in it to avoid oversampling larger counties.
- 3 The foreign born population percentage is calculated by first taking the sum of (1) populations that are not U.S. citizens, (2) populations that are citizens who were born abroad and (3) populations that receive citizenship through naturalization process and then divided by the total population.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix A. State-level Distribution of 110 Sampled Counties

State	# of Counties	Percentage	Region
Alaska	1	0.91	West
Arizona	1	0.91	West
California	19	17.27	West
Colorado	4	3.64	West
Connecticut	4	3.64	Northeast
District of Columbia	1	0.91	South
Florida	9	8.18	South
Georgia	1	0.91	South
Hawaii	1	0.91	West
Idaho	1	0.91	West
Illinois	1	0.91	Midwest
Indiana	2	1.82	Midwest
Iowa	1	0.91	Midwest
Kansas	1	0.91	Midwest
Kentucky	1	0.91	South
Maryland	5	4.55	South
Massachusetts	8	7.27	Northeast
Michigan	1	0.91	Midwest
Minnesota	2	1.82	Midwest
Missouri	1	0.91	Midwest
Montana	1	0.91	West
Nebraska	1	0.91	Midwest
Nevada	2	1.82	West
New Hampshire	1	0.91	Northeast
New Mexico	1	0.91	West
New York	6	5.45	Northeast
North Carolina	1	0.91	South
Ohio	4	3.64	Midwest
Oklahoma	1	0.91	South
Oregon	5	4.55	West
Pennsylvania	5	4.55	Northeast
Rhode Island	1	0.91	Northeast
South Carolina	1	0.91	South
Texas	3	2.73	South
Utah	1	0.91	West
Virginia	5	4.55	South
Washington	5	4.55	West
Wisconsin	1	0.91	Midwest

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