

Mapping Areas in Need of Immigrant-Focused Crisis Support

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Abstract. In crisis preparedness, response, and recovery, providing inclusive services to immigrants is of significant importance. By pinpointing vulnerable areas, public libraries can offer more tailored, efficient, and impactful services to immigrant communities. This study aims to outline a method to identify the critical areas in need of immigrant-inclusive crisis support by integrating the socioeconomic, natural hazard risk, and broadband use information of counties. After a clustering analysis, we identified counties with a relatively high proportion of immigrants, facing high risk of natural hazards while having a deficit in broadband use. This study serves as a foundational step toward future work that will investigate the status of library services considering immigrants' needs in high-need areas. The project aims to promote inclusive services for fostering social cohesion, economic growth, and sustainable development.

Keywords: public library · public service for crisis · immigrants · resilience-building

1 Introduction

Public Libraries have been seen as vital public institutions in supporting community resilience to crisis by providing information services and coordinating cross public sectors [13]. Libraries are highly committed to inclusivity and equity in their services by providing accessible and available services to all individuals regardless of their demographic, economic, or physical attributes. Serving immigrants in crisis is an integral component of inclusive service provision.

As an immigrant country, the United States has large number of immigrants, accounting for over 14.4% of its populace, originating from diverse global regions. Immigrants often face challenges in crisis preparedness, response, and recovery (PRR) due to obstacles like linguistic differences, legal matters, societal exclusion, and lack of representation in policy decision-making. They tend to be more vulnerable compared to local inhabitants during crises of natural disasters and pandemics [11], while have limited access to crisis-related information as well as government and social support [15]. On the other hand, their resilience building against crisis face obstacles due to communication and networking [8, 9], legal status [11], community involvement [15], and economic factors [2]. It is vital to

provide services that consider the characteristics of immigrants and meet their needs.

However, currently, there is a lack of understanding whether immigrants' needs have been considered and met in crisis related services by public libraries. First, the needs of immigrants are not fully investigated, especially for immigrants in under-resourced communities. Second, there is lack of comprehensive investigation into the current status of crisis-related services for immigrants in public libraries. In this preliminary study, we focus on identifying critical areas where immigrant-inclusive crisis-related service is critical. Specifically, we used public data to identify counties that have a relatively higher proportion of immigrants with a deficit of broadband services, and subject to high risks of disasters. Public libraries in these counties will be further investigated in future studies. The research will investigate the strategies and actions that are needed, and that have been planned or taken by considering immigrants' needs. The ultimate goal is to promote the inclusivity of immigrants in crisis-related services by identifying gaps in service provision and best practices to enhance public libraries' role in supporting immigrant communities.

2 Related Work

There are studies on the vulnerability of immigrants in disasters, but not much has focused on the needs of immigrants from under-resourced communities. Vulnerability is multi-dimensional, stemming from various sources and intersecting in complex ways. Immigrants often face unique challenges due to their socio-cultural background and economic and legal status. Behbahani et al. [2] examined the Latino immigrant communities in the New York Metropolitan area during the COVID-19 and found these communities have long faced deficiency in health care resources, thus facing *physical vulnerability*. *Economic vulnerability* pertains to the financial loss caused by the crisis, which includes direct loss due to damages, as well as indirect financial instability caused to employment status. The financial instability of immigrants has been identified in several studies [2, 16]. Due to the legal status of immigrants, their employment is usually at-risk pre-crisis. The crisis can further exacerbate the situation after the crisis [11]. *Social vulnerability* refers to discrimination or conflicts targeted to individuals based on their demographics. Hunt et al conducted a misinformation study on the rumors that targeted immigrants [9]. The misinformation "immigration status is checked at shelters" was spread during both Hurricane Hargey and Hurricane Irma, which on one hand, reflects the potential hostility and conflicts faced by immigrants, and underscores the deep-rooted insecurity that might be faced by immigrant groups. Their vulnerabilities are multi-dimensional. They are not only affected by disasters but also face societal challenges. Prevailing societal grievances seek avenues to vent in times of crisis, and immigrants can be easily targeted to be the subjects of the projected frustrations. Gender inequality has been found in the Thai women group, who were victims of the tsunami in the Tohoku region of Japan in 2011 [15]. *Psychological vulnerability* refers to mental

health issues that could be caused by stressors from crises, such as traumatic events. People who’ve experienced past traumas may be more susceptible. A systematic review and meta-analysis of literature on the psychological distress and psychiatric disorder after natural disasters show that rates of psychological distress and psychiatric disorders significantly increased after disasters [1]. Vu and VanLandingham evaluated the mental health of Vietnamese Immigrants in New Orleans after Hurricane Katrina. Their physical and mental health status significantly declines immediately after the disaster. In the second year, although these measures have been substantially recovered, several factors such as being less acculturated, and having extensive post-disaster property damage impede their recovery in mental and physical health [18]. Mental health issues are also identified in the immigrant community in Calgary [16].

Public libraries have served immigrants in their practices but there is a lack of comprehensive systematic research that goes beyond case studies on inclusive planning and development of services for immigrants, especially in disaster settings. During the height of the COVID-19 crisis, public libraries were revealed as telemedicine hubs which allow users to overcome and “mitigate telemedicine disparities” [6]. Mersand et al. [12] explain that “due to their strong legitimacy in the eyes of citizens and the types of services and programs they are already providing, which in many cases go well beyond what could be considered traditional library services,” public libraries can be centers of technologically connected smart communities. In particular, public libraries in rural communities are understood to be key resources for community members experiencing crisis situations [3, 10, 5].

3 Identify Vulnerable Areas

The literature review shows the perspectives that should be considered to support immigrants in crisis PRR. The following study aims to identify critical areas that have a high need to address the inclusivity of immigrants in crisis related services. We assume the areas to have a relative high proportion of immigrants, more people of low socioeconomic status, and a lack of communication facilities like broadband services. Areas that lack broadband services will have more limitations to access crisis-related information. For these areas, public information services to help them access information becomes critical. We utilized multiple sources of information to identify such counties, as public libraries are usually administrated by counties.

3.1 Data Sources

American Community Survey (ACS). ACS is an integral component of the U.S. Census Bureau’s data collection efforts, serving as a continuously updated source of information about the nation’s changing demographics, economic conditions, housing patterns, and more [4]. We use the following attributes of counties to estimate the demographics and socioeconomics of the population:

(1) population, (2) number of households, (3) residents from naturalization, (4) residents who are not US citizens, (5) residents who speak Spanish and are not proficient at English, (6) residents who speak other languages and are not proficient at English, and (7) residents whose income is below the poverty line in the last 12 months. Attributes of (3)-(7) are percentages to the population.

National Risk Index (NRI). The NRI index is a dataset, developed by the Federal Emergency Management Agency (FEMA), provides a comprehensive, holistic analysis by evaluating the risk of 18 natural hazards, such as earthquakes, floods, hurricanes, and wildfires, in different communities. More than just identifying the presence of these hazards, the NRI integrates factors like expected annual loss, social vulnerability, and community resilience to give a multifaceted perspective on where and how risks might be experienced [7]. The aggregated indexes, i.e., risk score, social vulnerability score, and resilience score are used. For future investigation, risk indexes by categories of hazards can be used.

Indicator of Broadband Need (IBN). The IBN is a dataset used for understanding disparities in broadband access across counties in the US. The indicator amalgamates various data sources to shed light on areas with limited or no broadband infrastructure, regions where residents predominantly rely on slower internet services, and locales with significant self-reported barriers to acquiring broadband [17]. We choose the following attributes to assess the broadband use: (1) the percentage of households with no computers or smartphones, (2) the percentage of households with no Internet, and (3) the percentage of households with broadband use.

Public Libraries in the US. The dataset is a Public Libraries Survey collected by the Institute of Museum and Library Services (IMLS) [14]. IMLS provides annually updated data about the location of libraries, information about library visits, size of collections, public service hours, staffing, etc. This dataset will help identify public libraries in the critical areas where we can do further investigations.

3.2 Identification of Critical Counties

The demographics and socioeconomics of populations, national risk index, and broadband use are obtained for each county. Statistical tests are conducted to reveal the relations between population, risk index, and broadband use.

Normality tests were conducted on all attributes with the Shapiro-Wil test. The tests show that all the attributes are not normally distributed. To explore the relation of variables, Spearman’s Rank correlation test is used. It assesses how well the relationship between two variables can be described using a monotonic function. The correlation tests show some interesting insights.

Indicators of Immigrants. Table 1 shows the Spearman’s Rank correlation between the four indicators of immigrants. The four indicators are positively correlated with statistical significance. Counties with more residents from naturalization tend to have more residents who are not US citizens (0.75). Proportion of residents who are not US citizens is highly related to the number of people

Table 1. Spearman’s rank correlation rho for indicators of immigrants.

	Naturalization	Not US Citizen	Spanish Speaking	Other Language
Naturalization	1.00	0.75	0.64	0.53
Not US Citizen		1.00	0.82	0.45
Spanish Speaking			1.00	0.25
Other Language				1.00

who speak Spanish and are not proficient at English (0.82). Spanish-speaking and other language-speaking residents have positive correlation, But the correlation is not very high (0.25).

Table 2. Spearman’s rank correlation rho for indicators of immigrants and broadband use, risks, and poverty.

	Naturalization	Not US Citizen	Spanish Speaking	Other Language
No computer	-0.57	-0.44	-0.27	-0.40
Not Internet	-0.52	-0.37	-0.19	-0.42
Broadband use	0.34	0.26	0.17	0.34
Natural hazzard risk	0.49	0.46	0.39	0.41
Resilience	0.16	-0.01	-0.14	0.30
Poverty	-0.27	-0.13	-0.05	-0.16

Locations of Immigrants. Table 2 shows the Spearman’s rank correlations between immigrant indicators and other variables. Counties with more immigrants are more populated areas with more broadband use, however, with higher risk and social vulnerability scores. A noteworthy point is that counties with more Spanish speaking residents have lower resilience scores (-0.14), While counties with more other language speaking residents have higher resilience scores (0.30). More immigrants are usually associated with lower poverty rate. However, the relation between Spanish speaking residents and poverty is not significant (-0.05).

We conducted a simple unsupervised algorithm, Kmeans, to cluster counties into groups, where counties in the same group share similar characteristics. Before the Kmeans, all attributes are normalized. Attributes with high correlations are removed. We decided to run Kmeans with 5 clusters based on the Elbow method. Table 3 shows the cluster centroids that could represent the characteristics of groups. Cluster 5 have relatively high number of households, high natural hazard scores, and high immigrant indicators. At the same time the poverty rate is in the middle. We select counties from this group for further investigations.

Specifically, Table 4 shows 15 counties are identified as having relative deficit of broadband usage, high risk of natural hazards, and high percentage of immigrants or people who are not so well at English. There are in total 48 public libraries identified in these counties.

Table 3. Kmeans cluster centroids for clustering of counties.

Clusters	Households	Broadband	Risk	Naturalization	Spanish	Other	Poverty
1	0.30	0.59	1.00	0.34	-0.04	0.30	-0.43
2	-0.24	0.22	-0.65	-0.38	-0.38	-0.28	-0.58
3	-0.29	-2.05	-0.62	-0.41	-0.23	-0.27	0.72
4	-0.21	0.14	0.12	-0.18	0.23	-0.25	0.77
5	2.40	0.58	1.26	3.33	2.21	2.62	-0.29

Table 4. 15 Counties Potentially in Need of Crisis-related Services for Immigrants.

County	States	Pop	Broadband	Risk	Naturalization	Immigrant	Poverty	Libraries
Seward County	Kansas	22223	0.58	61.7	0.11	0.26	0.11	5
LaGrange County	Indiana	40085	0.69	52.9	0.01	0.13	0.05	1
Hendry County	Florida	39439	0.76	91.2	0.11	0.20	0.23	1
Ford County	Kansas	34426	0.83	66.0	0.07	0.21	0.10	3
Colusa County	California	21780	0.84	95.4	0.12	0.18	0.12	1
Imperial County	California	180051	0.86	98.1	0.15	0.32	0.17	6
Yuma County	Arizona	202944	0.90	91.7	0.12	0.18	0.16	2
Dawson County	Nebraska	24031	0.90	78.8	0.11	0.16	0.11	5
Dakota County	Nebraska	21284	0.91	57.0	0.12	0.20	0.10	3
Lee County	Florida	752251	0.91	99.5	0.09	0.09	0.11	4
Maverick County	Texas	57769	0.94	60.2	0.13	0.33	0.22	2
Yolo County	California	216703	0.94	97.4	0.11	0.12	0.16	3
Santa Barbara	California	447651	0.94	99.4	0.08	0.15	0.12	5
St. Lucie County	Florida	324599	0.94	98.3	0.11	0.07	0.11	1
Harris County	Texas	4697957	0.95	100.0	0.10	0.18	0.14	6

4 Conclusion

From access to telemedicine to crisis information sharing, public libraries provide a number of services to vulnerable populations. While vigorous research has been conducted on public library services provided to general populations and to rural populations, there is more investigation needed on the services provided to immigrants in crisis situations. Using a robust investigation of data related to public needs, this study identifies the top 15 US counties where immigrant-focused community resilience services may be needed.

The next step in our work is to conduct further investigation on the status of the inclusivity of immigrants in crisis-related services by public libraries from two perspectives: 1) whether current community resilience services in libraries have considered the characteristics and needs of immigrants and how, and 2) immigrants' perceptions of the roles public libraries take in crisis PRR. Using surveys and focus group interviews with librarians, as well as focus group and individual interviews with members of immigrant communities in these counties will allow us to holistically investigate both the ways in which public libraries serve immigrant communities in crisis situations and the needs that are still to be met.

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