Community Risk Mitigation Research

A Data Science Study into the Inequities of Preparedness Education in the Chicago Region

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Contents

Abstract

One who considers the steps needed in preparing the United States population for disasters asserts a hefty task. While the impacts of disasters and emergencies are on an incline in the United States, a significant percentage of Americans are not prepared for said events [Smith, 2018, Petkova et al., 2016]. This negatively impacts the safety of our communities and puts homeland security at risk. While children and youth are most impacted by emergencies and disasters, they can be seen as major assets for creating lasting cultural change.

The Chicago School Preparedness study utilized email-administered computer survey via Google Forms to collect data in order to answer questions, how schools are currently preparing students for disaster and how the Federal Emergency Management Agency's (FEMA) free resources for schools, such as the Student Tools for Emergency Planning, are reaching schools. The study also analyzes if affluency factors predict whether or not schools are preparing their students for disaster.

Overall, the results suggest that the educators believe that preparedness is at least somewhat important aspect of curriculum. However, they are not aware of the existence of free preparedness materials, which indicates that income levels might impact school preparedness [Halstead and Taylor, 2005].

Background

The 2020 Chicago Community Mitigation Research Study is a tool to help Federal Emergency Management Agency (FEMA) and the Youth Preparedness Council prioritize efforts to achieve the ultimate goal: harvesting

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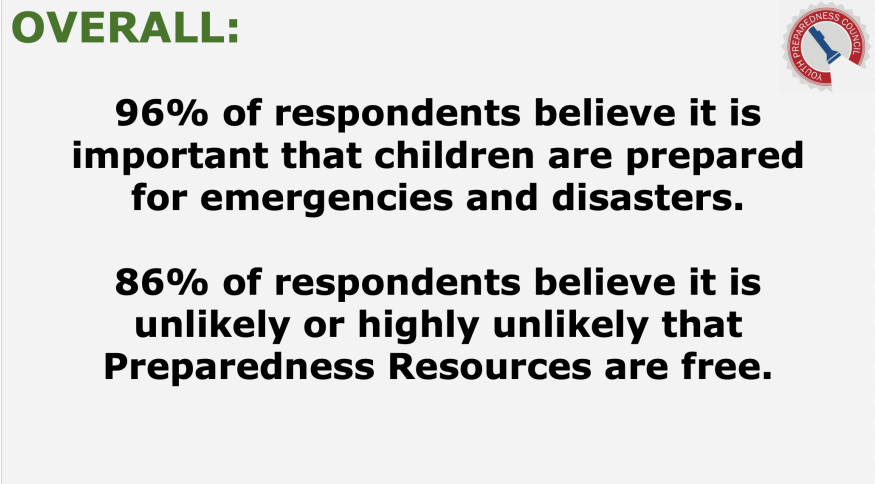

Figure 1: Debrief findings

a culture of preparedness. The study entails surveying Chicago school educators to determine how well FEMA is meeting their goal of preparing our youth with the knowledge needed to prepare for disaster using federally-funded educational materials, such as the Student Tools for Emergency Preparedness (STEP) program. Further, the study looks at modeling whether or not economic factors influence whether or not one has the means to become prepared for an emergency or disaster.

Preparing the United States for disaster presents a daunting challenge. Many studies show that less than 40% of the United States populus is prepared for a disaster. While disasters are on steady increase in the past decades, in both cost and lives, children and youth are disproportionately impacted by these events [FEM, 2018]. As evidenced by successful marketing campaigns, such as seat belt enforcement and anti-smoking, reaching children with impactful messaging can facilitate lasting cultural change. Schools provide an ideal venue for fostering a shift in values around disaster preparedness, ensuring that future generations will internalize the importance of preparedness and take steps to prepare for disaster [Browne and Olson, 2019, Dragani].

While there are many aspects of emergency management, the STEP program was developed primarily for 4th and 5th graders to help come to the aid of igniting the culture of preparedness within schools. This program connects youth to the concepts of emergency management by attempting to educate on the basics of emergency management, as well as integrating an emergency family communication plan and building an emergency supply kit. To help ease implementation turbulence, the STEP program can be taught by teachers and complies with other curriculum standards in science and english. Due to the localized nature of the educational structure in the United States, this program has been successfully placed into other Region V States: Michigan and Wisconsin. Unfortunately, Illinois has not seen an implementation of the STEP program [Griffith, 1997]. Another popular preparedness program developed by FEMA to create a culture of preparedness is the Prepare with Pedro coloring book. This curriculum is an engaging coloring book which includes a trip around the country with a penguin, whose name is Pedro; in which, Pedro experiences various emergencies across the country.

All preparedness materials offered by the Federal Government are free for school use. As such, it is vital to investigate whether or not the lack of implementation is due to lack of interest, or simply not knowing that these materials exist for schools to use.

FEMA management and staff can use this survey to focus on specific service areas and issues important to schools in the Chicago region. Making informed choices allows FEMA to better serve duties, protect communities, and enhance the quality of response efforts during emergencies. This has the potential to save lives and better protect national security [Patel et al., 2017].

While geospotting was completed, all respondents were promised to have anonymized results. This means

that the benefits of knowing the location of respondents was able to be maintained, however, at the same time, respondents did not feel that their privacy was at-risk. Map districts were based upon census-collected information on populations within Chicago neighborhoods. This was paired via previously collected data from the University of Illinois at Chicago [Browne and Olson, 2019]. Surveys were sent out on a census-group-based map with a certain number of schools within each district. These districts were designed to be representative of certain demographic and income data found in the 2010 Census. Upon completion of the survey, each school was offered to be followed-up with to see if they would like to be offered free preparedness materials. Following the completion of this study, each school which expressed interest will be given an opportunity to be sent free preparedness materials to prepare their students.

The Conclusion section of this report highlights key findings from the survey. Subsequent sections present detailed context and a full description of the survey methodology, including a copy of the questionnaire.

The initial survey questions ask basic knowledge on emergency planning material. This is subsequently followed by four key opinion tracking questions focusing on:

- Overall view on the culture of preparedness;
- The benefit of preparedness materials in schools;
- Perceptions of preparedness material's value for the money;
- Whether or not certain affluence factors impact preparedness levels.

Conclusions

Although the concept of preparedness is generally well-regarded by Chicago schools, the knowledge of such materials is nonexistent in Chicago communities. This poses an utmost dire consequence to children, one of the most vulnerable groups, of not being prepared to face emergencies and disasters when they strike. This means that schools do value preparedness in their education structures, however, the materials and knowledge simply are not there so that they can make actionable changes in their curriculum.

Based on data collected, an overwhelming amount of school educators and administrators find that preparedness should prepare their students for emergencies and disasters. This means that educators are well-aware of the interests that a well-prepared student body means for a community. All regions, with a few subsectors exceptions, of regions were seen to believe that preparedness is at least a somewhat important aspect of curriculum.

This map does not present any potential correlative data which suggests whether or not income has an impact on the view of preparedness. As such, it is found that most populations hope to be seen as resilient and it being a part of a cultural norm.

Contrary to the respect that educators and school administrators have for preparedness, a vast majority of data collection finds that schools do not live up to this believed responsibility. School administrators and teachers do not believe that their schools are currently preparing their students for disasters. The data collected does not suggest any correlative meaning between income and whether or not a school is adequate preparing its students. It is seen that most schools, regardless of income, neglect to put disaster preparedness into relative means.

86% of respondents believe that it is unlikely or highly unlikely that preparedness resources are free. This serves in contrast to many educational materials that are in the United States. The vast majority of textbooks and other valuable resources are not free to schools. As such, this perspective of needing to pay for educational resources seems to spread to the perception of preparedness materials.

> The decrease in likelihood is primarily due to losses in the top ratings (e.g., "very likely," would "definitely" likelihood). The decline in perceptions is fairly evenly split among the "very important" and "important" categories. This foments that these resources are seen to not be easily accessible nor readily available. More analysis below.

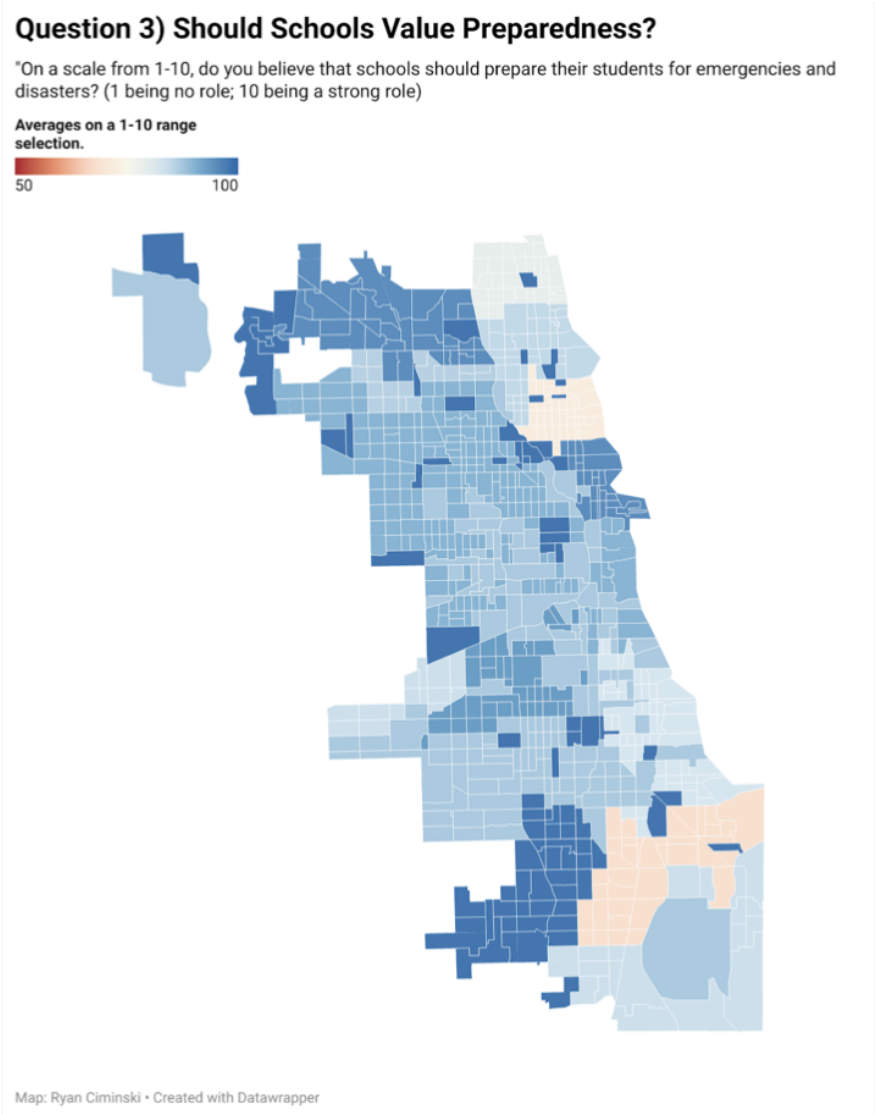

Figure 2: Mapped answers to "Should shcools value preparedness?" quesiton from the survey.

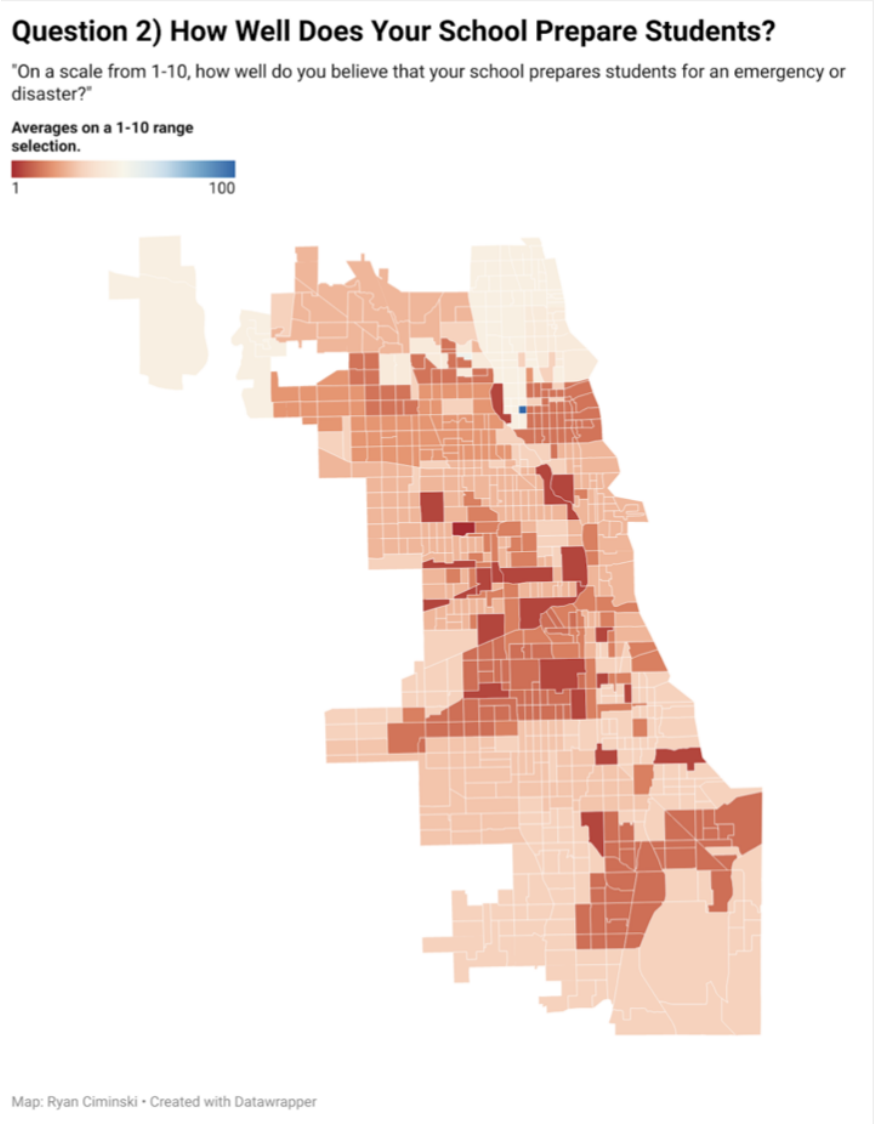

Figure 3: Mapped answers to "How well does your school prepare students?" quesiton from the survey.

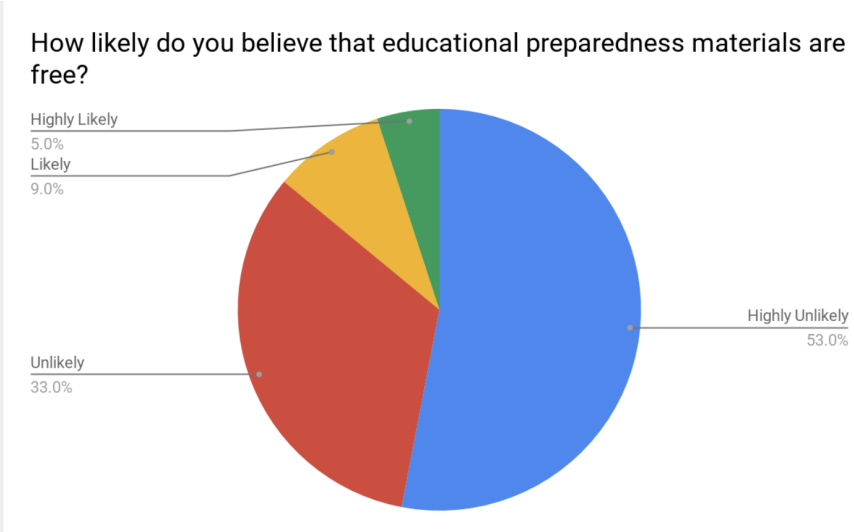

Figure 4: Pie chart summary of how likely educators believe the materials are free.

Schools, overwhelmingly, would like to be sent free preparedness resources, if they were offered to them. It is seen that schools in lower-income levels seem to have more interest in free preparedness resources. This may be due to the reasoning that schools in lower-income communities may not be as adequately funded as their other counterparts in high-income communities.

The question by which asserts the most data contrast, is when educators and school administrators are to estimate how prepared their students are for emergencies and disasters.

- For reference, data collected from the University of Illinois at Chicago and the Voohees Center, of which shows average income levels in the city of Chicago. This is based on the same Census district maps of which data was presented above on.

As seen in Figure 6, schools clearly have been able to see the value in programs to spark resilience at a young age. They believe that there is value in arming students with the knowledge and resources to be prepared. As a result of programs like STEP and Prepare with Pedro, children will know how to act when disasters strike. Not only does this increase preparedness, but rather it can help ignite the change of creating a culture of preparedness. Creating this culture can be done through increasing knowledge, but also through kids diffusing the message of preparedness and being champions for change. This can be seen with kids bringing home preparedness materials to families.

We see that income levels only further contrast in how preparedness educators and school administrators find their students. We see that in low-income districts, educators are likely to describe their students as not adequately described for an emergency or disaster. On constract, educators who work in higher-level income neighborhoods are more likely to view their students as prepared for disasters. This suggests a potential correlation between one's average income and preparedness. This data modeling is backed by the findings of FEMA in their Household Preparedness Survey. Of which, it was a key takeaway in this National Household Survey, which consisted of 5,292 randomly selected adults, that the income demographic is one of the vital predictors of one's potential preparedness. As such, it is 89% more likely that a person is in a pre-completion stage of preparedness if they are considered low-income.

Another important note to make regarding the intercepted data is that schools, which are found in lower-income areas, are more likely to express interest in utilizing free resources provided by the federal government.

However, there is a clear disconnect with this connotation to the actual ability to harvest said excitement for preparedness. Although preparedness is well-regarded amongst Chicago educators, they find themselves not being aware of where curriculum may be found for said topic. This lack of knowledge is further banded by the vast majority of schools finding it unlikely that said resources are free. This poses a fiscal limitation to

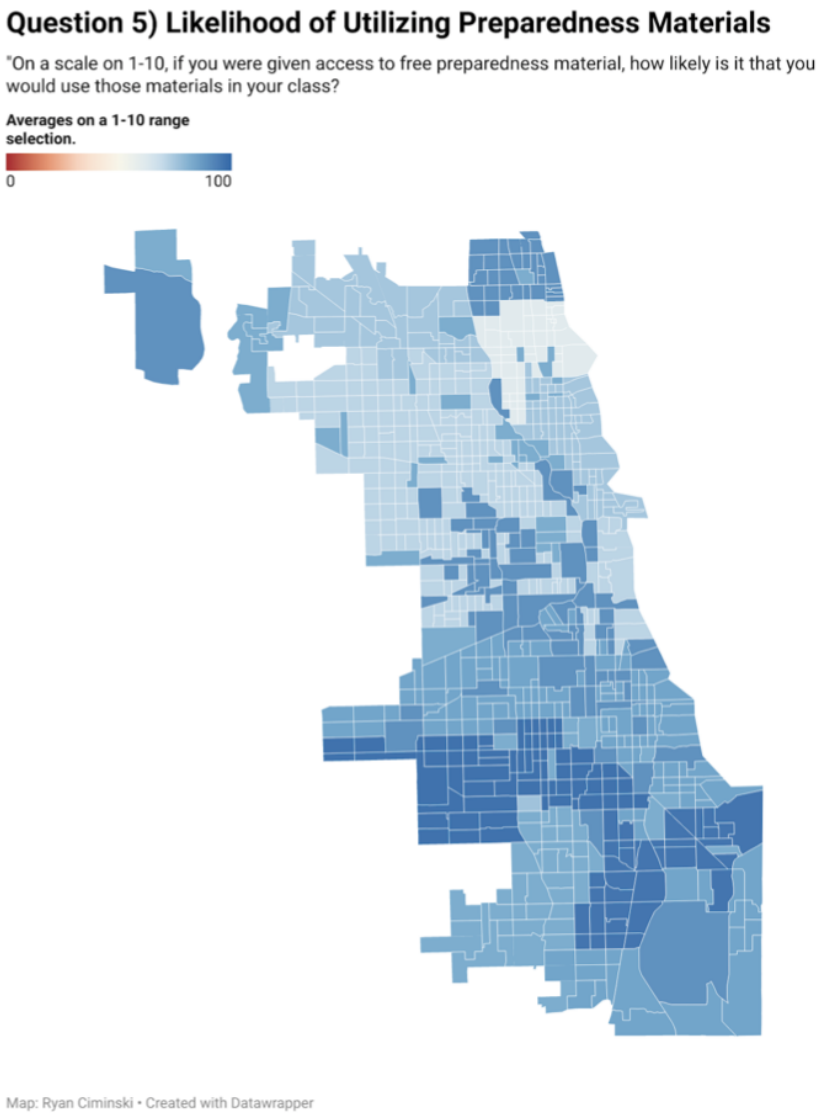

Figure 5: Mapped answers to "Likelihood of utilizing prepraedness materials" quesiton from the survey.

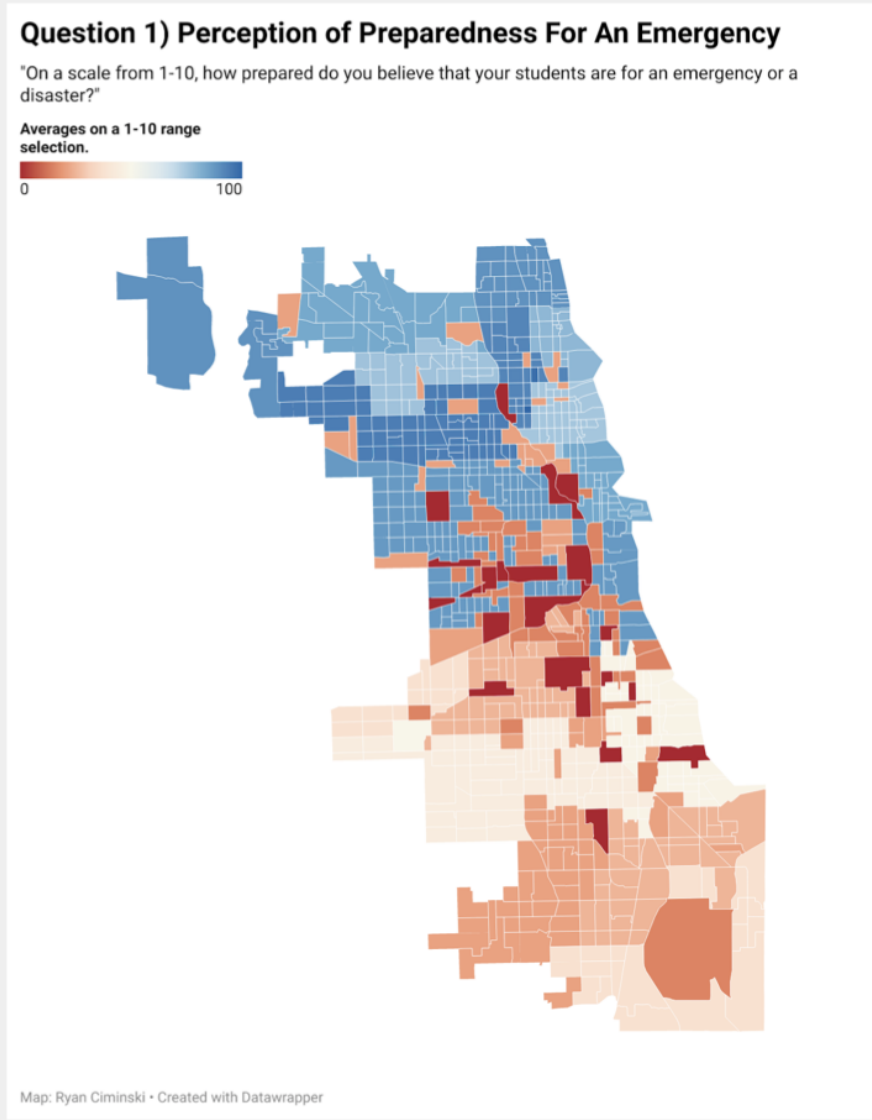

Figure 6: Mapped answers to "Perception of preparedness for an emergency" quesiton from the survey.

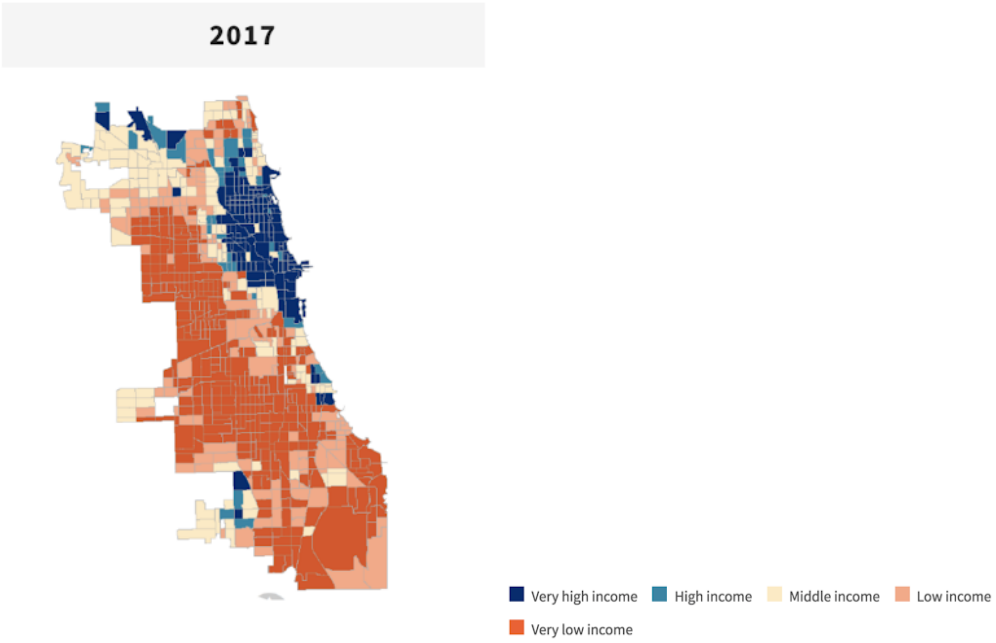

Figure 7: 2017 map of Illinois by income (from UIC).

ignite the culture of preparedness in our schools, and as a result, the hard work of FEMA management is lost as they are unable to reach these schools. As stated; programs such as STEP are simply unknown to school administrators. In actuality, when clearing the fog from this issue, STEP materials, along with a magnitude of other resources, are easily accessible on FEMA.gov. This must be made known to educators and school administrators if we are to boost the usage of these specific resources.

Key factors behind this disconnect between schools and preparedness agencies continue to be: lack of knowledge, inaccessibility, and the localized educational structure of America. In addition, concerns about the fiscal counterpart to accessing preparedness materials. As such; it should be of top priority to consume FEMA management and advisors, along with state counterparts, to make sure that schools are not only aware of the presence of these documents; but rather, the ease of accessibility. While a nationalized ciricullium would be seen as ideal for an implementation of a preparedness curriculum, this ideal is not attainable currently given the localized nature of education in the United States. Other countries, such as Australia and Canada, have been able to implement national preparedness curriculum standards into their education successfully.

As it stands, it takes action on behalf of school administrators and teachers to actively seek out said resources, an action that can be hard to be rooted out.

Another core recommendation for boosting preparedness in the United States would be a successful public policy campaign. We have seen that previous successful public policy campaigns, such as “Click It Or Ticket” and anti-smoking campaigns, have been able to implement a lasting cultural change amongst Americans. If we are to ignite this needed change, which is needed for preparedness, national leadership should focus on creating another successful public policy campaign to make this cultural change.

Many projects, on behalf of the Youth Preparedness Council, continue to be of top priority to Region V. Igniting our Youth to be an integral part of expanding preparedness is key to making this cultural change.

Technical details

This was a large-scale survey to gather data on the perspective of preparedness resources, creating a culture of preparedness in school, and generalized school profiles including consideration to demographics and socioeconomic factors. This is a first of its kind survey to be completed.

This survey was conducted in partnership with the FEMA Region V Youth Preparedness Council and the SoReMo fellowship program at the Illinois Institute of Technology. The underlying goal of creating uniformity of knowledge on various preparedness educational material implementation, along with uniting the aspects of income levels, specifically in the city of Chicago. This is at the heart of the reason for this poll: to see how preparedness is meeting Chicago schools, and seeing if correlative data exists to suggest that income levels impact school preparedness. It is believed that further research is still needed to specifically point to various factors that may define a direct causation relationship between income levels and how prepared a community is. However, this being said, it is vital to know that it was found that

Methodology

Email-administered computer survey via Google Forms

Benefits of this email-based survey include high response rates (42%), impeccable geocoding rates (100%), and the ability for the interviewer to clarify questions and responses, and no net cost. As such, it was found that the non-abrasive nature of seeking out data was quite influential to response rates. Those who were asked to give out their opinions often felt inclined to and felt comfortable doing so, given the basis of the anonymous survey results. Geocoding rates, of which are seen the ability to put the data collected onto a map, of which, the map represents a population-scaled proportion. This is as the map was divided into sectors via census data, which was combined with population zoning statistics found on the Chicago Public Schools website.

Survey conducted between the dates of February 15th and April 19th of 2021; emails were sent during the times 9am-6pm.

The survey was not sent out onto a mass-scaled list. As such, this made the survey request seem reasonable, and simply more personable to one who was looking to fill it out.

Questions asked within survey:

1) "On a scale from 1-10, how prepared do you believe that your students are for an emergency or a disaster?
2) "On a scale from 1-10, how well do you believe that your school prepares students for an emergency or a disaster?
3) "On a scale from 1-10, do you believe that schools should prepare their students for emergencies and disasters? (1 being no role; 10 being a strong role)
4) "On a scale from 1-10, how likely do you believe that educational preparedness materials are free?"
5) "On a scale from 1-10, if you were given access to free preparedness material, how likely is it that you would use those materials in your class?"

License

Acknowledgements

At the time of this writing, the author is a fourth-year Region 5 FEMA Youth Preparedness Council Member.

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