SOJOURNER CLIENTS AND ACCESS TO TECHNOLOGY: A GEOSPATIAL ANALYSIS

When 'Safer-At-Home' is Not Actually Safe

2023

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Acknowledgments

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ABSTRACT

This research is based on community engagement and collaborative efforts between Sojourner Family Peace Center and Marquette University faculty. In this study, we aim to examine access to technological resources across Wisconsin ZIP codes and Milwaukee **census tracts** where Sojourner's clients reside and to produce insights about how Sojourner might close any technological gaps. The Sojourner clients who participated in this study reside in 30 different Wisconsin ZIP codes and 58 different Milwaukee census tracts, and each of these areas exhibits differences in the distribution of technological resources across space. **A significant correlation was found between the census tracts where the Sojourner clients from this study reside and the proportion of households that had limited access to computer technology or relied primarily on smartphone access**; the neighborhoods where many Sojourner clients reside are characterized by higher levels of violent crime, violent crime in neighboring communities, and concentrated disadvantage levels. These **regression analyses** were designed to sort out which variables in this study can predict residential tracts in which Sojourner's clients live when other variables are held constant. The variables in this study include various measures of technology access, concentrated socioeconomic disadvantage, and other neighborhood characteristics such as population and area size; and all of these variables are considered in the regression analyses run. The initial results of these regression analyses suggest that violent crime is the only statistically significant predictor of the tracts in which Sojourner clients live. This means that Sojourner's clients tend to reside in neighborhoods marked with high levels of violent crimes and that their experience of domestic violence is part of the larger pattern of violence that occurs in the neighborhoods. However, caution must be taken when interpreting the findings of this regression analysis due to the low numbers of respondents whose data were aggregated to census tracts. Future studies should gather and analyze more data on Sojourner clients to better understand the role that technology (*i.e.*, internet, computers, smartphones, *etc.*) plays in supporting their technological needs. This is especially important in the context of the shifting landscape of **eFiling** in Milwaukee County and beyond.

CENSUS TRACT

Census tracts are small, relatively permanent statistical subdivisions of a county that are uniquely numbered with a numeric code; and each census tract averages 4,000 inhabitants, with no fewer than 1,200 residents and no more than 8,000. Every 10 years census tracts are reviewed for updating—resulting in merging or splitting of census tracts that are either smaller than 1,200 residents or larger than 8,000 residents and the assignment of new numeric codes. Any changes are documented so data can be compared from decade to decade.

REGRESSION ANALYSIS

A branch of mathematical statistics that unifies various practical methods for investigating the character (i.e., how a variable might be related to the outcome) and strength (i.e., whether or not a correlation is statistically significant) of relationship between a dependent variable (i.e., an outcome) and independent variables (also known as "predictors," "explanatory variables," or "features") using statistical data.

eFILING

A truncation for "Electronic Filing;" to use an Internet-accessible system established for the purpose of submitting documents to a court, automatically integrating them into the court case management system, and electronically serving them to involved parties.

INTRODUCTION

This study identifies ZIP codes and census tracts where clients who have used Sojourner Family Peace Center's services since the start of the pandemic reside in order to assess the technological resources available to them and produce insights about how the agency might address technology gaps that may exist in those ZIP codes and census tracts.

Advancements in technology offer benefits as well as drawbacks for domestic violence victims.[1] On the one hand, the increase in technological accessibility we have witnessed in the past several decades allows organizations that serve domestic violence victims a valuable tool for sharing their resources online. Counseling services and support information can be accessed via email, chat, or on websites.[2] In addition, for survivors of violence, the option to pursue eFiling of temporary restraining orders reduces transportation barriers, travel and childcare costs, time away from work, and provides an alternative process in times of dangerous weather conditions.[3] On the other hand, the use of internet and e-mail among domestic violence victims must be carried out discretely, especially when accessing online resources, because their batterers may access their e-mail accounts and investigate their internet search history.[4] Also, the use of online filing tools, such as eFiling, may be difficult in areas where there is limited access to high-speed internet, cell service, and limited availability of technological devices, such as smartphones, computers, or tablets.[5]

In Milwaukee County, mandatory eFiling began on September 1, 2017, requiring that lawyers and high-volume filing agents submit all court documents related to "civil, small claims, family, paternity, criminal, traffic, and ordinance-forfeiture cases" via the eFiling portal found on the Wisconsin Court System website.[6] This requirement does not apply to self-represented litigants, for whom eFiling is available on a voluntary basis.[7] eFiling of temporary restraining orders may be especially valuable because it allows domestic violence victims to "file the petition, be heard by the judge, and receive signed orders and notification regarding service on the defendant . . . [as well as] services such as safety planning, housing, and workforce support from the domestic violence agency" without having to engage a third party.[8] Seen in this light, eFiling creates and deepens the collaboration between criminal justice agencies and service providers, like Sojourner Family Peace Center, in supporting domestic violence survivors.

In March 2020, at the start of the COVID-19 pandemic, Governor Tony Evers issued the "Safer-at-Home" order asking families to stay at home to help prevent the spread of COVID-19; the order called for the closing of nonessential businesses where victims of domestic violence may have sought shelter. While the spirit of the "Safer-at-Home" order may have been to protect the well-being of all Wisconsin residents, the order essentially made it more difficult for survivors of domestic violence to seek support from service providers such as Sojourner and obtain assistance with filing restraining orders because they were quarantining at home with the individuals who were abusing them.[9] At the same time, online filing of temporary restraining orders may have been especially difficult during the pandemic for individuals who had limited access to technological resources, which stemmed both from structural and practical barriers.[10] Structural factors that reduce access to technology, such as internet connectivity problems in low-internet-coverage zones, can limit help-seeking among individuals who are less familiar with technology and less comfortable using technology to discuss sensitive topics.[11] Giving information to service providers may be difficult enough; doing so in an area that has low or no internet coverage becomes much more difficult. Survivors of domestic violence may also face practical barriers to the use of technology within their homes. For example, perpetrators of domestic violence may use digital trackers and spyware to further exert control over the victim.[12]

Given the important role that technology access may have in support-seeking behavior among survivors of domestic violence, this study examines the overlap between the areas where Sojourner clients live and the technological resources in the community. This study examines access to technological resources available across ZIP codes and census tracts where the Sojourner clients who participated in this study reside to provide practical information about the role that technology may play in supporting technological needs of Sojourner's clients, such as eFiling.

1   Silverstein | "The Double Edged Sword: An Examination of the Global Positioning System, Enhanced 911, and the Internet and Their Relationships to the Lives of Domestic Violence Victims and Their Abusers"

2   Silverstein | "The Double Edged Sword"

3   Aldrich, *et al.* | Addressing Domestic Violence in Rural Communities: Best Practices for Criminal Courts

4   Silverstein | "The Double Edged Sword"

5   Aldrich, *et al.* | *Addressing Domestic Violence in Rural Communities*

6   State Bar of Wisconsin | "Get Ready: Mandatory E-Filing in Milwaukee County Starts Sept. 1"

7   Wisconsin Court System | "Wisconsin Circuit Court eFiling"

8   Aldrich, *et al.* | *Addressing Domestic Violence in Rural Communities*, 7–8
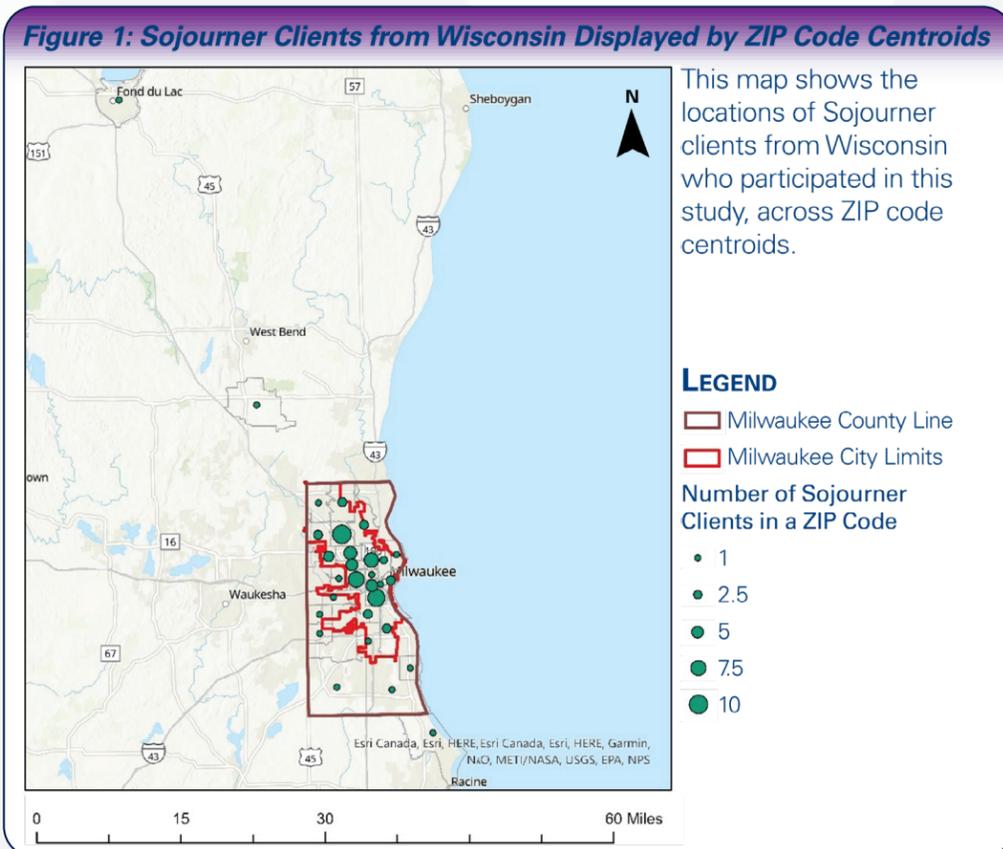
9   Fox6 Milwaukee | "'Abusers Count on Isolation': 'Safer-at-Home' Not always the Case for Domestic Violence Victims"

10   Emezue | "Digital or Digitally Delivered Responses to Domestic and Intimate Partner Violence during COVID-19"

11   Emezue | "Digital or Digitally Delivered Responses..."

12   Freed | "'A Stalker's Paradise': How Intimate Partner Abusers Exploit Technology"

BACKGROUND

The study is based on a collaboration between Sojourner Family Peace Center and Marquette University faculty who were supported by graduate and undergraduate students with funding from the university's President's Challenge award. The primary data for this study were collected via phone surveys and interviews of Sojourner's clients who used the agency's services between June 20, 2020, and February 19, 2021. This study analyzed the first wave of the data, which included responses from 91 individuals who consented to participate in this study between August 19, 2020, and June 7, 2021. Aside from the variables that are beyond the scope of this paper, and which are examined elsewhere,[13] the data collected during the phone interviews included the residential address and the ZIP code where Sojourner clients lived at the time of their participation in the study.

One study participant declined to provide their ZIP code, and another study participant resided outside of the state of Wisconsin. These two data points are excluded from the analyses, resulting in 89 spatially referenced data to be used in the geospatial analyses presented here. The data on ZIP codes were geocoded and subsequently aggregated to the census tracts that are within the state of Wisconsin. The study participants lived in 30 different Wisconsin ZIP codes. In addition, 79 out of 89 (88.76 percent) study participants disclosed their residential address as well as their ZIP code. The data on residential addresses and ZIP codes were geocoded and subsequently aggregated to the census tracts that are within the city of Milwaukee boundaries because the majority of the respondents resided within the city of Milwaukee. These 79 study participants lived in 58 different census tracts that lie within the city's borders.

As shown in Figure 1, the Sojourner clients who participated in this study primarily come from ZIP codes that are part of Milwaukee County, and more frequently the city of Milwaukee. Milwaukee's ZIP code 53218 was a home to 10 of Sojourner's clients who participated in the study, and the ZIP codes 53204, 53206,

Figure 1: Sojourner Clients from Wisconsin Displayed by ZIP Code Centroids

This map shows the locations of Sojourner clients from Wisconsin who participated in this study, across ZIP code centroids.

LEGEND
☐ Milwaukee County Line
☐ Milwaukee City Limits
Number of Sojourner Clients in a ZIP Code
· 1
· 2.5
· 5
· 7.5
● 10

53208, 53210, 53216, and 53233 are each a home to at least 5 or more Sojourner clients who were surveyed.. Taken together, the Sojourner clients primarily come from the northwest side of Milwaukee, Wisconsin.

Figure 2 shows the **population density** of the Sojourner clients who participated in this study by ZIP code. Unlike the proportional density map (see Figure 1), which scaled the size of symbols in proportion to the number of the clients who resided in that ZIP code, this analysis takes into account the varying sizes of ZIP codes in which participants resided at the time of their interview. Displayed in this manner, the ZIP codes with the highest concentration of Sojourner clients are 53204, 53206, and 53233. In these areas, the density of Sojourner's clients ranges between two and three persons per square mile. While there were some participants in zip codes outside of the Milwaukee area, those individuals sought out Sojourner's services while residing in the city. At the time of the survey, they had since relocated.

POPULATION DENSITY

A measurement that shows the concentration of people within a specific geographical locale. In Figure 2 of this paper, population density is the measurement of the number of study participants in a ZIP code area divided by the size of the area of that ZIP code

Figure 2: Sojourner Client Density from Wisconsin Displayed by ZIP Code Areas

This map shows the density of Sojourner clients from Wisconsin who participated in this study, across ZIP code areas.

Note: Density is measured as the number of clients who participated in the study per square mile of ZIP code areas.

LEGEND
☐ Milwaukee County Line
☐ Milwaukee City Limits
Population Density of Sojourner Clients
☐ 0.03 – 0.14
☐ 0.15 – 0.29
☐ 0.30 – 0.96
☐ 0.97 – 2.12
☐ 2.13 – 2.96

Next, the research team assessed the technological resources available in areas where Sojourner's clients resided. This analysis provided a comparison between the availability of technological resources across ZIP codes and the areas where study participants reside. Figure 3 shows the percentage of households that had broadband internet overlayed with the study participant population density map. The patterns, which are visually represented in the scatter plot from Figure 3, suggest an inverse relationship, where the areas with a higher concentration of study participants have lower access to broadband service. For example, in the three ZIP codes that had the highest concentration of Sojourner's clients (53204, 53206, and 53233), we can see that the access to broadband technology is lowest relative to other ZIP codes, with only 56.4 to 60.8 percent of all

households in those ZIP codes having broadband internet access. In contrast, the ZIP codes with the fewest study participants residing (53132, 53154) had the highest access to broadband technology, with more than 86.8 percent of households in those ZIP codes having broadband internet access.

Figure 3: Broadband Internet Access and Density of Sojourner Clients from Wisconsin Displayed by ZIP Code Areas

This map shows the percentage of households with broadband internet and density of Sojourner clients from Wisconsin who participated in this study, across ZIP code areas.

Note: Density is measured as the number of clients who participated in the study per square mile of ZIP code areas.

LEGEND

☐ Milwaukee County Line
☐ Milwaukee City Limits

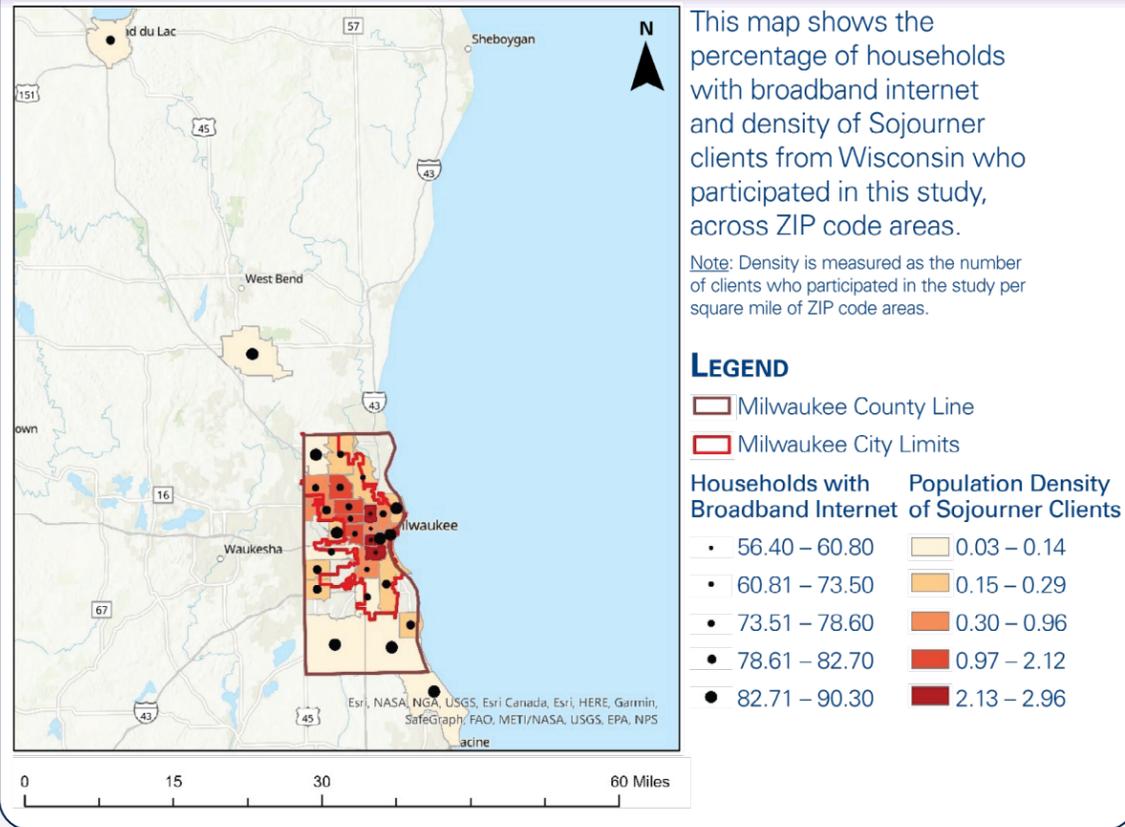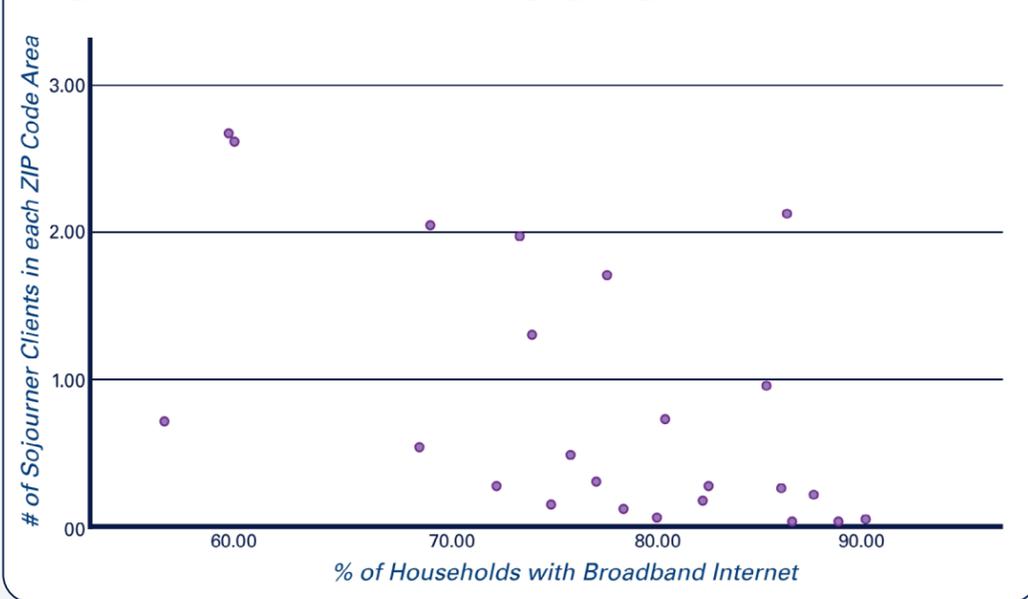| Households with Broadband Internet	Population Density of Sojourner Clients
· 56.40 – 60.80	0.03 – 0.14
· 60.81 – 73.50	0.15 – 0.29
· 73.51 – 78.60	0.30 – 0.96
• 78.61 – 82.70	0.97 – 2.12
● 82.71 – 90.30	2.13 – 2.96

Figure 3b: Scatterplot of Broadband Internet Access and the Number of Sojourner Clients from Wisconsin Displayed by ZIP Code Areas

As mentioned earlier, most of Sojourner's clients are from Milwaukee, so the number of Sojourner's clients who participated in the study is shown across Milwaukee census tracts in Figure 4. Here, we can see that the largest number of study participants are concentrated in small areas on the near north and near northwest side of the city (see Figure 5).

Figure 4: Sojourner Clients from Milwaukee, WI, Displayed by Census Tracts

This map shows the number of Sojourner clients from Milwaukee who participated in this study, across census tracts that have their center in Milwaukee.

LEGEND

☐ Milwaukee City Limits

Sojourner Clients from Milwaukee, WI
☐ 1
☐ 2
☐ 3
☐ 4
☐ No Study Participants
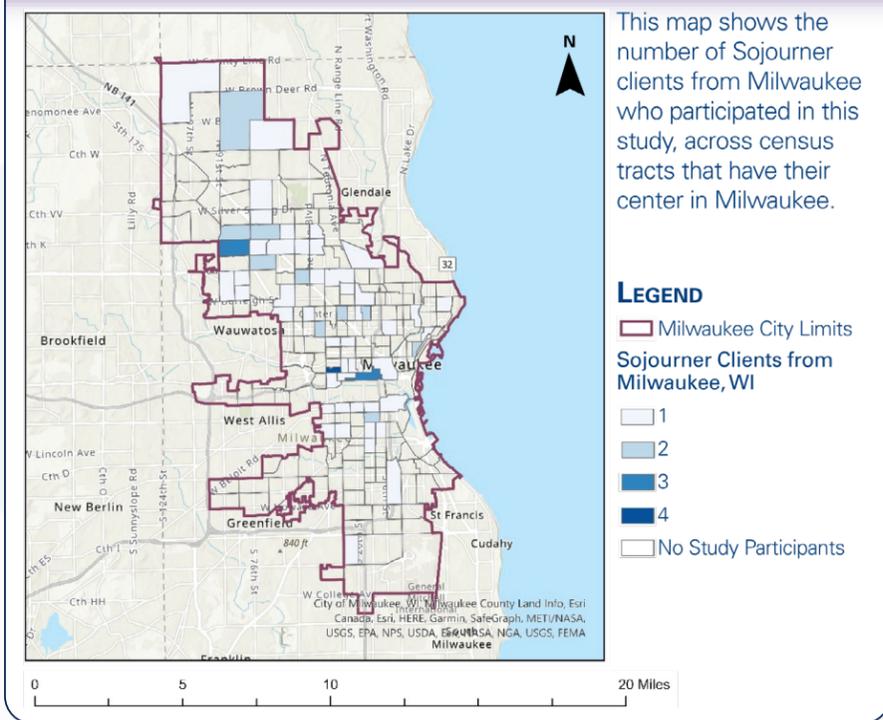
While ZIP codes can prove a useful unit of analysis—particularly in this study, where the sample dataset is small—they are large units of aggregation. As such, their size can obscure the spatial variation that exists in these areas. To offset this potential misinterpretation of the data, the research team also broke down the data by a smaller unit of aggregation—the census tract. Doing so revealed greater variation across space, which is evidenced when comparing Figures 2 and 4. Similarly, Figure 6 shows the proportion

of households with internet subscriptions across Milwaukee census tracts, overlayed with the number of Sojourner's clients across the tracts. Based upon this analysis, it appears that internet access varies across Milwaukee areas, with the lowest internet access being found in areas that are in close proximity to where Sojourner clients live.

Figure 5: Sojourner Client Density from Milwaukee, WI, Displayed by Census Tracts

This map shows the density of Sojourner clients from Milwaukee who participated in this study, across census tracts that have their center in Milwaukee.

Note: Density is measured as the number of clients who participated in the study per 1,000 census tract residents.

LEGEND

☐ Milwaukee City Limits

Sojourner Clients from Milwaukee, WI
☐ 0.00
☐ 0.01 – 0.53
☐ 0.54 – 1.32
☐ 1.33 – 2.63
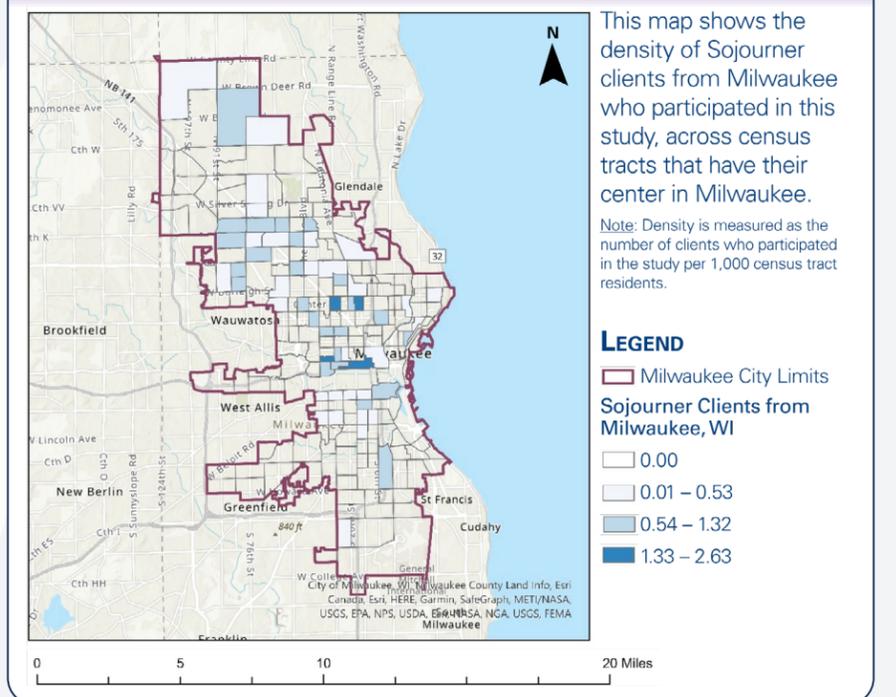
Figure 6: Internet Access and Sojourner Clients from Milwaukee, WI, Displayed by Census Tracts

This map shows the proportion of households with internet subscription across Milwaukee census tracts that have their center in Milwaukee and Sojourner clients from Milwaukee who participated in this study.

LEGEND

☐ Milwaukee City Limits

Households with Internet Subscription
- 0.40 – 0.55
- 0.56 – 0.66
- 0.67 – 0.75
- 0.76 – 0.86
- 0.87 – 0.97

Sojourner Clients
- 1
- 2
- 3
- 4
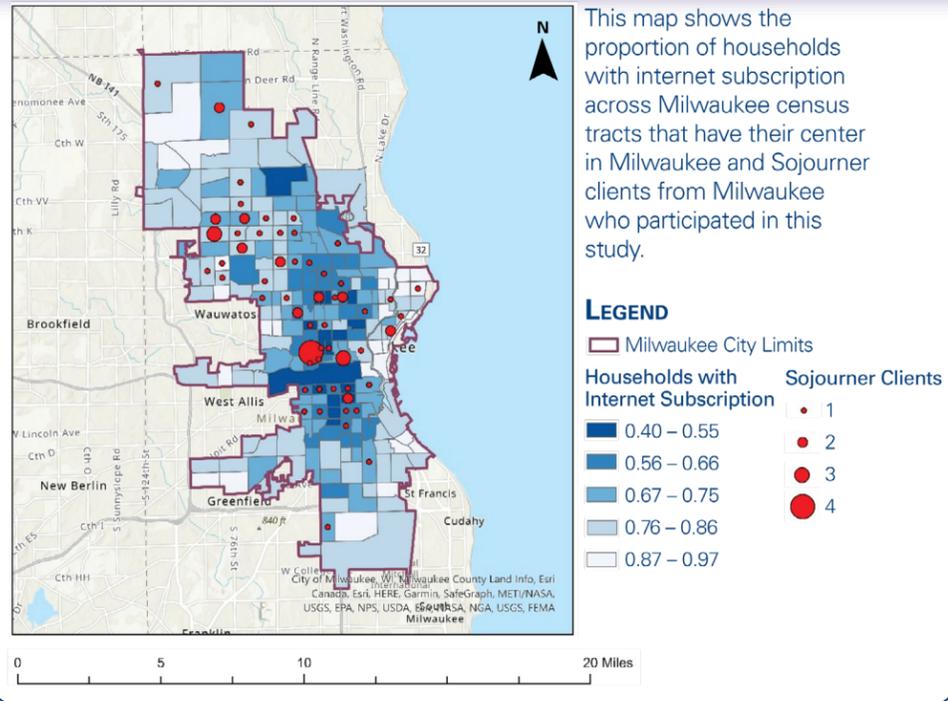
Similar patterns seem to emerge around access to physical technological devices, such as computers or smartphones in Milwaukee, as shown in Figures 7 and 8. One notable detail from this part of the interview data is that access to computers or laptops is much more limited than access to smartphones across these areas. In Milwaukee, census tracts that have very low levels of access to computers or laptops seem to be concentrated in the near south side and the west side of Milwaukee. These areas of the city do have some overlap with the areas where study participants reside. In most of these same areas, however, participants reported having greater access to smartphones. While access to smartphones was greater in these broad sections of the city, it was somewhat limited in the near south side and the near north side, with pockets of limited smartphone accessibility in the near northwest side. These figures also show the locations of Sojourner's clients who participated in the study, revealing that areas with higher smartphone access may have a higher number of Sojourner clients. Conclusions regarding computer access are less clear based on these spatial patterns.

Figure 7: Computer Access and Sojourner Clients from Milwaukee, WI, Displayed by Census Tracts
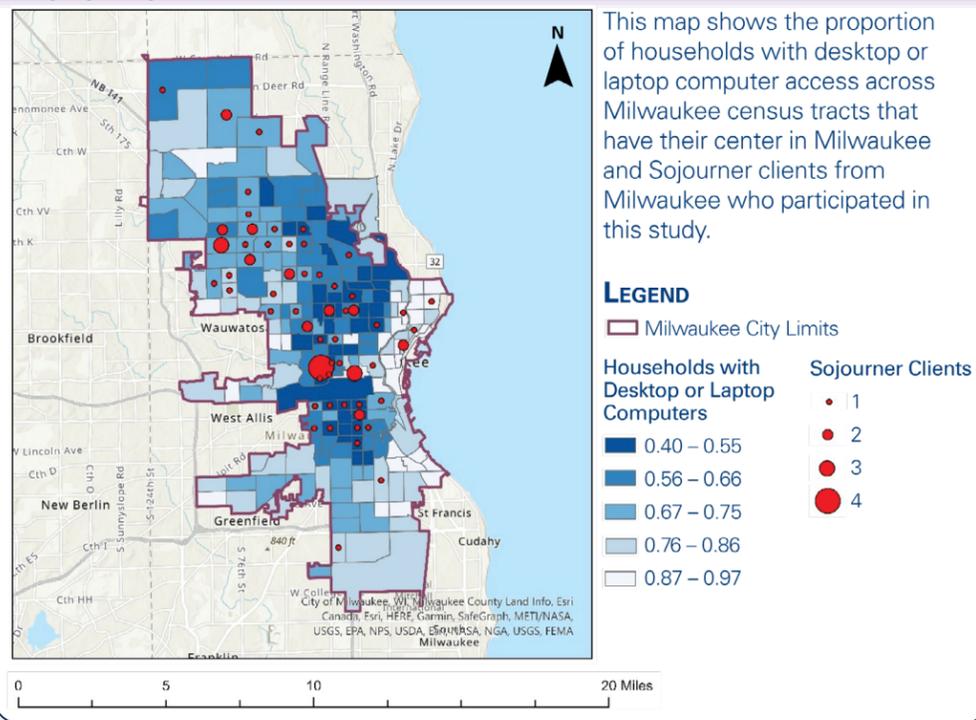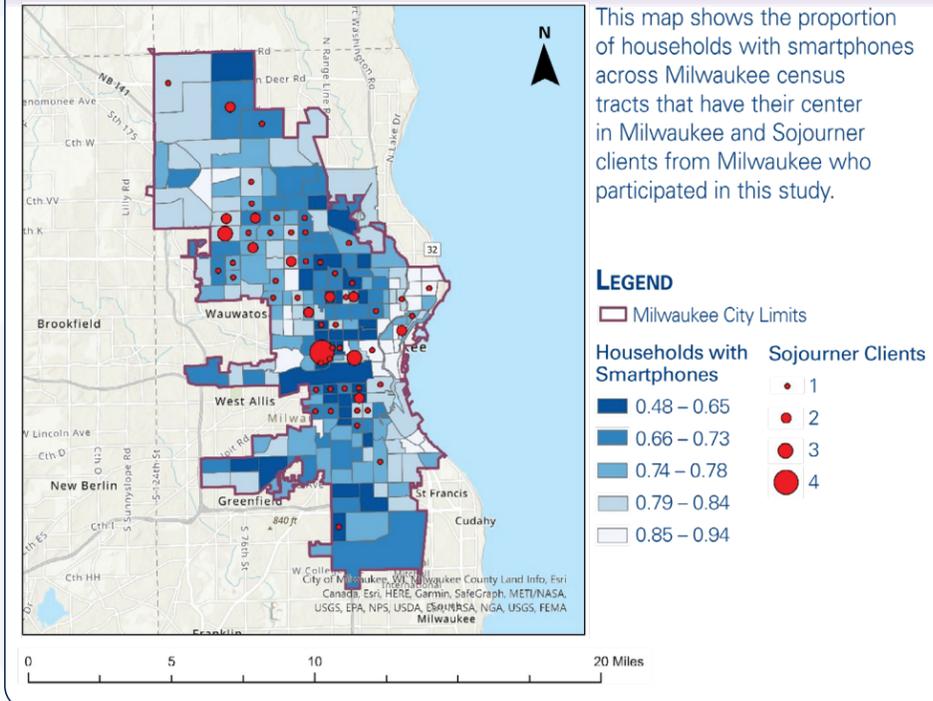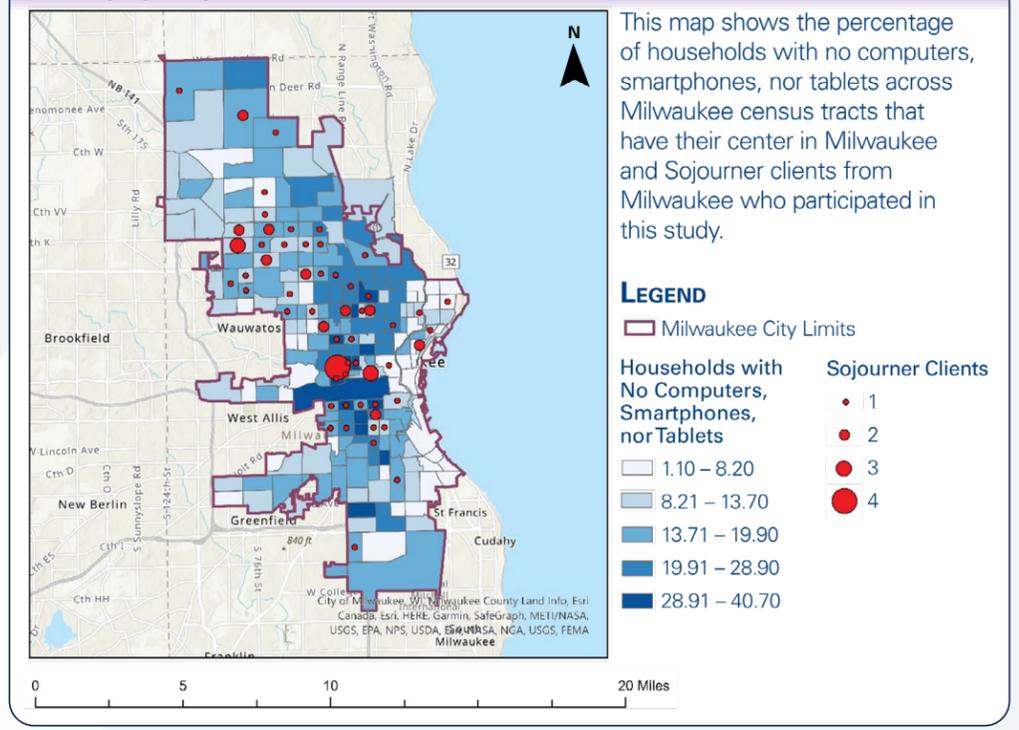
This map shows the proportion of households with desktop or laptop computer access across Milwaukee census tracts that have their center in Milwaukee and Sojourner clients from Milwaukee who participated in this study.

LEGEND

☐ Milwaukee City Limits

Households with Desktop or Laptop Computers
- 0.40 – 0.55
- 0.56 – 0.66
- 0.67 – 0.75
- 0.76 – 0.86
- 0.87 – 0.97

Sojourner Clients
- 1
- 2
- 3
- 4

Figure 8: Smartphone Access and Sojourner Clients from Milwaukee, WI, Displayed by Census Tracts

This map shows the proportion of households with smartphones across Milwaukee census tracts that have their center in Milwaukee and Sojourner clients from Milwaukee who participated in this study.

LEGEND

☐ Milwaukee City Limits

Households with Smartphones
- 0.48 – 0.65
- 0.66 – 0.73
- 0.74 – 0.78
- 0.79 – 0.84
- 0.85 – 0.94

Sojourner Clients
- 1
- 2
- 3
- 4

The analysis also included an evaluation of the households with absolutely no computing technology. This lack of access to computing technology, including computers (desktop or laptop), smartphones, or tablets, across Milwaukee census tracts is shown in Figure 9. Areas that had the lowest access to computing technology were found in the near south side and the near north side. In these areas, between 28.91 and 40.70 percent of households have no access to technology. These areas also seem to correlate with the areas where Sojourner's study participants reside, so some spatial overlap is noticeable there.

Figure 9: Computing Technology Access and Sojourner Clients from Milwaukee, WI, Displayed by Census Tracts

This map shows the percentage of households with no computers, smartphones, nor tablets across Milwaukee census tracts that have their center in Milwaukee and Sojourner clients from Milwaukee who participated in this study.

LEGEND

☐ Milwaukee City Limits

Households with No Computers, Smartphones, nor Tablets
- 1.10 – 8.20
- 8.21 – 13.70
- 13.71 – 19.90
- 19.91 – 28.90
- 28.91 – 40.70

Sojourner Clients
- 1
- 2
- 3
- 4

Two additional variables were examined in the following **choropleth maps**; the first is violent crime density and the second is concentrated socioeconomic disadvantage. First, because areas that have high levels of domestic violence also tend to have high levels of violence in general, Figure 10 shows the spatial distribution of violent crim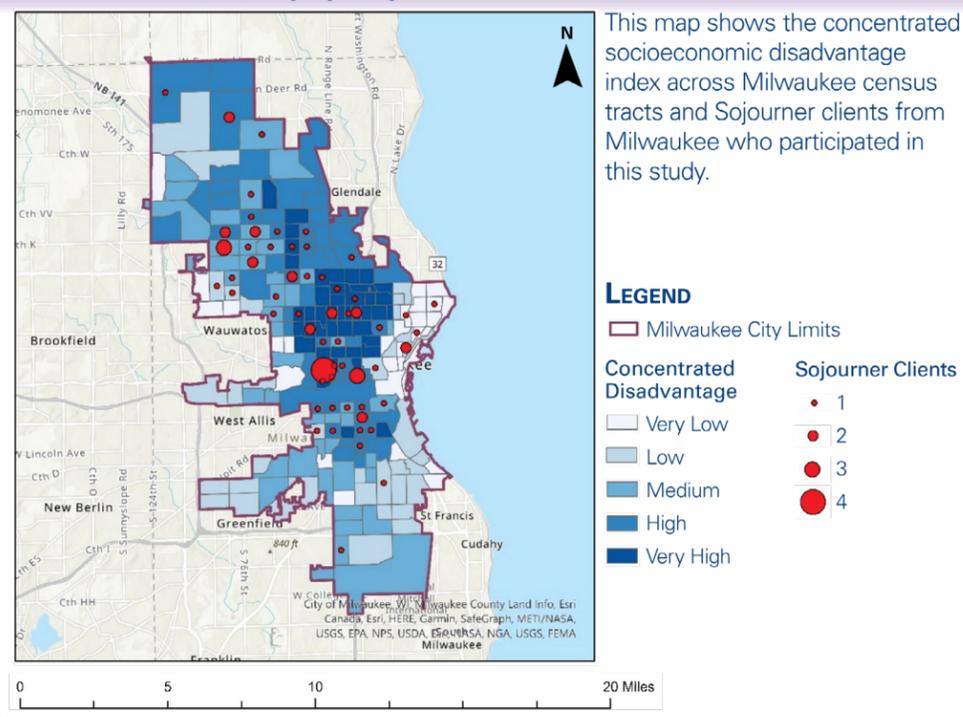e relative to the number of study participants across census tracts in Milwaukee. Although there are some exceptions, it appears that many study participants reside in areas with a high or very-high level of violent crime. Second, Figure 11 shows concentrated socioeconomic disadvantage across Milwaukee census tracts.

Figure 10: Violent Crime Density and Sojourner Clients from Milwaukee, WI, Displayed by Census Tracts

This map shows the density of violent crime across Milwaukee census tracts that have their center in Milwaukee and Sojourner clients from Milwaukee who participated in this study.

Such disadvantage was determined by a combination of several indicators: (1) households receiving social security income; (2) households receiving public assistance income; (3) population that is 16 years and over that is unemployed; (4) households with income lower than the poverty level; and (5) single-parent households that have children under the age of 18 living in them (Cronbach's alpha > 0.07) . Here, we see that concentrated disadvantage was found in the

Figure 11: Concentrated Socioeconomic Disadvantage and Sojourner Clients from Milwaukee, WI, Displayed by Census Tracts

This map shows the concentrated socioeconomic disadvantage index across Milwaukee census tracts and Sojourner clients from Milwaukee who participated in this study.

northwest side of the city, with additional pockets of it found in the near south side and far northwest side. At the same time, the highest concentration of study participants was found in the same regions or in nearby areas where high levels of concentrated disadvantage exist.

The **graduated symbol** and choropleth maps shown in Figures 10 and 11 provide insights into the possible overlap between variables of interest. These maps help us visualize the relationships between study participants' place of residence and these other common predictors of domestic violence. While the maps do document such patterns, they do not indicate whether these visualized relationships are meaningful or statistically significant. Thus, the next set of analyses sought to determine whether the associations between the locations of Sojourner's clients and technological resources are statistically significant. To begin with, Table 1 shows the descriptive statistics across Milwaukee census tracts for the technology, crime, and socioeconomic indicator variables. The table also shows the descriptive statistics for additional control variables, such as

CHOROPLETH MAP

A visual representation of statistical data for a specified area using a map of the area with predetermined vectors drawn in (e.g., ZIP code areas or census tracts), and those vectors are color-coded to match the vector's data

CRONBACH'S ALPHA

A number between 0 and 1 that expresses the measure of internal consistency (i.e., how closely related a set of items are as a group) of a test or scale

GRADUATED SYMBOLS

Shapes/designs/images of varying sizes that are used to show quantitative differences between mapped features (e.g., dots of increasing sizes are used in several of the choropleth maps in this paper)

Table 1: Descriptive Statistics for Milwaukee Census Tracts (N = 239)

STATISTIC DESCRIPTION	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
# of Sojourner Clients in a Census Tract	0.00	4.00	0.31	0.63
Proportion of Households with Internet Access	0.00	0.97	0.65	0.27
Proportion of Households with Desktop Computer Access	0.00	0.96	0.55	0.26
Proportion of Households with Smartphone Access	0.00	0.94	0.66	0.26
Percentage of Households with Computing Technology Access	0.00	40.70	13.79	9.26
Violent Crime in a Census Tract	0.00	209.00	62.21	50.35
Socioeconomic Disadvantage in a Census Tract	−2.59	2.38	0.03	0.96
Violent Crime Lag in a Census Tract	0.00	146.00	64.99	38.89
Total Population in a Census Tract	0.00	5,488.00	2,267.05	1,012.19
Area (in square miles)	0.00	4.89	0.40	0.52

violent crime lag, total population, and the area size of census tracts.

The variables were subsequently analyzed to establish whether statistically significant correlations are evident for the variables, as shown in Table 2. Across Milwaukee census tracts, there is a **statistically significant bivariate association** between residential census tracts of Sojourner clients and (a) the proportion of households with smartphone access (r = 0.136), (b) the percent of households with no access to computing technology (r = 0.251), (c) violent crime (r = 0.327), (d) socioeconomic disadvantage (r = 0.232), and (e) violent crime levels in the neighboring census tracts (r = 0.304). This means that census tracts in which study participants live are those where we would find relatively high levels of violent crime (both in and around the area), socioeconomic disadvantage, and lower access to computing technology.

STATISTICALLY SIGNIFICANT BIVARIATE ASSOCIATION

An occurence in data analysis when the analysis of a relationship between two variables provides results that are not explained by chance alone

The research team also explored the connection between the technology measures (*i.e.*, the proportion of households with internet access, the proportion of households with either desktop or laptop access, the proportion of households with no access to any computing technology—computers, smartphones, and tablets), the control variables (crime, socioeconomic disadvantage, *etc.*), and the number of Sojourner clients across Milwaukee census tracts. The analysis was designed to examine whether any of these measures have a statistically significant association with the locations where Sojourner clients reside while accounting for all other variables in the models. The results of the negative binomial regression analysis suggest that the broad concept of technology access does not have a statistically significant association with the locations of Sojourner's clients, as none of the technology access variables were found to be statistically significant predictors of where Sojourner clients who participated in this study resided. Instead, **the only statistically significant predictor of study participants' locations is the level of crime in the census tracts**.

Table 2: Correlation Matrix for Milwaukee Census Tracts (N = 239)

	CENSUS TRACT STATISTIC DESCRIPTION	1	2	3	4	5	6	7	8	9	10
1	# of Sojourner Clients in a Census Tract	1	0.105	0.042	0.136*	0.251**	0.327**	0.232**	0.304**	−0.041	0.004
2	Proportion of Households with Internet Access	0.105	1	0.941**	0.962**	0.197**	0.233**	0.020	0.164*	−0.034	0.296**
3	Proportion of Households with Desktop Computer Access	0.042	0.941**	1	0.884**	0.026	−0.004	−0.194**	−0.046	0.025	0.275**
4	Proportion of Households with Smartphone Access	0.136*	0.962**	0.884**	1	0.300**	0.352**	0.165*	0.289**	−0.118	0.248**
5	Percentage of Households with Computing Technology Access	0.251**	0.197**	0.026	0.300**	1	0.600**	0.691**	0.553**	−0.254**	0.109
6	Violent Crime in a Census Tract	0.327**	0.233**	−0.004	0.352**	0.600**	1	0.653**	0.794**	−0.016	0.184**
7	Socioeconomic Disadvantage in a Census Tract	0.232**	0.020	−0.194**	0.165*	0.691**	0.653**	1	0.690**	−0.352**	−0.014
8	Violent Crime Lag in a Census Tract	0.304**	0.164*	−0.046	0.289**	0.553**	0.794**	0.690**	1	−0.162*	0.049
9	Total Population in a Census Tract	−0.041	−0.034	0.025	−0.118	−0.254**	−0.016	−0.352**	−0.162*	1	0.324**
10	Area (in square miles)	0.004	0.296**	0.275**	0.248**	0.109	0.184**	−0.014	0.049	0.324**	1

*CORRELATION IS SIGNIFICANT AT THE 0.05 LEVEL (2-TAILED).
**CORRELATION IS SIGNIFICANT AT THE 0.01 LEVEL (2-TAILED).

Table 3: Technology Access, Violent Crime, and Neighborhood Characteristics Regressed on Sojourner Clients for Milwaukee Census Tracts (N = 239)

REGRESSION STATISTIC DESCRIPTION	B	STD. ERROR	LOWER	UPPER	P-VALUE
Proportion of Sojourner Clients in a Census Tract with Internet Access	−0.04	0.77	−1.54	1.47	0.96
Proportion of Sojourner Clients in a Census Tract with Desktop Computer Access	1.12	0.67	−0.19	2.43	0.09
Proportion of Sojourner Clients in a Census Tract with Smartphone Access	−1.03	0.72	−2.44	0.37	0.15
Percentage of Sojourner Clients in a Census Tract with Computing Technology Access	0.01	0.01	−0.01	0.02	0.29
Violent Crime in a Census Tract	0.00	0.00	0.00	0.01	0.01
Socioeconomic Disadvantage in a Census Tract	0.01	0.07	−0.13	0.16	0.87
Violent Crime Lag in a Census Tract	0.00	0.00	0.00	0.01	0.25
Total Population in a Census Tract	0.00	0.00	0.00	0.00	0.79
Area (in square miles)	−0.10	0.08	−0.27	0.06	0.23
(Intercept)	−0.10	0.18	−0.36	0.33	0.94

Although all of these associations are **statistically significant, the strength of each of these associations is very weak (meaning that even though the value of one variable changes when the value of another variable changes, the correlation between these values is minimal)**. Thus, some caution must be used when interpreting these findings.

The findings of the binomial regression analyses must be evaluated within the context of the data on Sojourner's clients. In this study, 79 study participants lived in 58 different census tracts that lie within the city of Milwaukee, and the relatively low number of census tracts where they reside may have implications for these findings. Future studies should gather more data from Sojourner's clients so that the **multivariate analyses** could be estimated with richer and larger datasets.

MULTIVARIATE ANALYSIS

A process involving multiple dependent variables that result in one outcome

CONCLUSION

Although the findings of this study suggest some tentative associations between technological resources and locations where Sojourner clients live, these associations are very weak; the only significant predictor of where Sojourner clients live is the violent crime measure. With that caveat, there is one concrete solution that can be implemented across ZIP codes or census tracts where Sojourner's clients live, to help address inequities in access to technological resources that can impact survivors of domestic violence. That is, in areas where internet accessibility is low, community leaders may work with community members to better inform them about the Federal Communications Commission Lifeline Program, which provides discounts on phone services (all of which also includes mobile broadband and fixed broadband services).[14] Expanding broadband coverage in communities most impacted by domestic violence will help to serve those for whom online filing of temporary restraining orders is required, while also helping to improve health and equity for all community members.[15]

While the Wisconsin state statute prohibits municipalities from directly providing (or even subsidizing) broadband internet service to community residents, there is some preliminary evidence that suggests expanding internet coverage in underserved communities is a recognized need in the city and a goal for the future.[16] In fact, in April 2021, the City of Milwaukee announced its goal to begin to provide free Wi-Fi access in ten additional parks, resulting in availability of free Wi-Fi service in twelve public parks to date. The earliest efforts of this kind were implemented in 2003 in two parks: Pere Marquette and Cathedral Square.[17] Certainly, using public Wi-Fi service could present difficulties in accessing domestic violence resources and reporting on sensitive and private topics in a public setting, but the implementation of public Wi-Fi in communities where broadband access is limited may serve as a template for future expansion of Wi-Fi in all parts of our state.

14   Evans, *et al*. | "A Pandemic within a Pandemic: Intimate Partner Violence during COVID-19"; Federal Communication Commission | "Lifeline Program for Low-Income Consumers"
15   Tomer, *et al*. | "Digital Prosperity: How Broadband Can Deliver Equity to All Communities"
16   City of Milwaukee | "City Unveils Open-Access Wireless Internet in Ten Milwaukee Parks"
17   City of Milwaukee | "City Unveils Open-Access Wireless Internet in Ten Milwaukee Parks"

GLOSSARY

Census tract
Small, relatively permanent statistical subdivisions of a county that are uniquely numbered with a numeric code; and each census tract averages 4,000 inhabitants, with no fewer than 1,200 residents and no more than 8,000. Every 10 years census tracts are reviewed for updating—resulting in merging or splitting of census tracts that are either smaller than 1,200 residents or larger than 8,000 residents and the assignment of new numeric codes. Any changes are documented so data can be compared from decade to decade

Choropleth Map
A visual representation of statistical data for a specified area using a map of the area with predetermined vectors drawn in (e.g., ZIP code areas or census tracts), and those vectors are color-coded to match the vector's data

Cronbach's Alpha
A number between 0 and 1 that expresses the measure of internal consistency (i.e., how closely related a set of items are as a group) of a test or scale

eFiling
A truncation for "Electronic Filing;" to use an Internet-accessible system established for the purpose of submitting documents to a court, automatically integrating them into the court case management system, and electronically serving them to involved parties

Graduated Symbols
Shapes/designs/images of varying sizes that are used to show quantitative differences between mapped features (e.g., dots of increasing sizes are used in several of the choropleth maps in this paper)

Multivariate Analysis
A process involving multiple dependent variables that result in one outcome

Population Density
A measurement that shows the concentration of people within a specific geopgraphical locale

Regression anaysis
A branch of mathematical statistics that unifies various practical methods for investigating the character (*i.e.*, how a variable might be related to the outcome) and strength (*i.e.*, whether or not a correlation is statistically significant) of relationship between a dependent variable (*i.e.*, an outcome) and independent variables (also known as "predictors," "explanatory variables," or "features") using statistical data

Statistically Significant Bivariate Association
An occurence in data analysis when the analysis of a relationship between two variables provides results that are not explained by chance alone

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