

# **CHILD PASSENGER SAFETY NEEDS AND RESOURCES IN MICHIGAN**

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16. Abstract This study was performed to characterize child passenger safety resources in Michigan and to analyze the impact of Michigan's child passenger safety technicians (CPSTs), who are certified to instruct caregivers on how to correctly use child restraints. The objective was to provide OHSP with the information to guide equitable distribution of child passenger safety resources throughout Michigan. Analyses used existing data from the 2010 U.S. Census, the American Community Survey 2009-2013, Michigan State Police crash reports from 2010 through 2014, Michigan Office of Highway Safety Planning (OHSP) lists of certified CPSTs and their locations from 2012 to 2015, OHSP records of child restraint system distribution, and child passenger safety checklist form data from Safe Kids Michigan. Counties were considered areas at risk (with greatest need for child passenger safety resources) based on a composite risk score that included population characteristics including minority race, Hispanic/non-English speaking, poverty, and low educational attainment and crash-related injuries or suboptimal child passenger restraint behaviors associated with a crash adjusted for the child population $\leq 9$ years. Needs and resources were assessed for the 83 counties and 15 OHSP Traffic Safety Regions in Michigan. A survey of CPSTs in Michigan was conducted to gather data on the workforce characteristics. Results show that counties with the highest risk scores are concentrated in the southern Lower Peninsula of Michigan and the counties with the largest number of CPSTs are in the Lower Peninsula. The total number of CPSTs in Michigan has been stable around 950, with 140 to 260 new CPSTs in a given year. Only Keweenaw, Alcona, and Montmorency counties had no CPSTs who reported living or working there. The majority of CPSTs self-identified as white race. Spanish was the most common non-English language spoken by CPSTs. The largest proportions of CPSTs worked in law enforcement, social work/health education, and healthcare. Of the CPSTs considered "high-activity", most were both paid and volunteered for seat checks and many reported an affiliation with a Safe Kids Coalition. Car seat inspection (or fitting) stations and events were offered primarily in counties throughout the southern Lower Peninsula, with the largest number in metro Detroit and Kent counties. The number of children $\leq 9$ years per CPST per county was lowest in Gogebic (166) and highest in Jackson (4618). Forty counties had 1,000 or more children per CPST and were distributed throughout the state. Data from 32,411 Safe Kids Michigan seat checks revealed that nearly half resulted in a change in restraint type, installation method, or location in the vehicle. Half of seat checks included the distribution of a child restraint system. The most services per child $\leq 9$ years were provided in the following OHSP regions: Thumb Area, West Michigan, South Central, Traverse Bay Area, Huron Valley, and Upper Peninsula Regions. The fewest services per child $\leq 9$ years were provided in the Northern Lower, Southwest, Oakland, and Macomb/St. Clair Regions. In conclusion, the child passenger safety needs are not evenly distributed throughout the state. There is wide variation in the current distribution of child passenger safety resources. Many counties with the most resources have a greater unmet need than lower-resourced counties due to the large total number of children and children considered at risk living within them.			
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## Executive Summary

In 2014, over 16,000 children in Michigan aged 9 and under were involved in police-reported motor vehicle crashes (MVCs), resulting in nine fatalities, 825 non-fatal injuries, and 1,864 possible injuries. The risk to children of serious or fatal injury in a crash has declined dramatically as more children use appropriate restraint systems and child passenger safety laws have been strengthened. Although the passage of the upgraded law in Michigan in 2008 was a positive step, work to improve child passenger safety is still needed as MVCs remain a leading cause of death among Michigan children.

This study characterized child passenger safety needs and resources in Michigan. We analyzed the impact of Michigan's child passenger safety technicians (CPSTs). Our objective was to provide the Michigan Office of Highway Safety Planning (OHSP) with information to guide equitable distribution of child passenger safety resources throughout Michigan.

Analyses used existing data sources including the 2010 U.S. Census, the American Community Survey 2009-2013, Michigan State Police crash reports from 2010 through 2014, OHSP lists of certified CPSTs and their locations from 2012 to 2015, OHSP records of child restraint system distribution, and child passenger safety checklist form data from Safe Kids Michigan. Need for child passenger safety resources was assessed with composite risk scores weighted for population characteristics such as minority race, Hispanic/non-English speaking, poverty, and low educational attainment and the size of the child population  $\leq 9$  years. Numbers, characteristics, and activity of CPSTs were obtained from OHSP lists and an online survey. Child Passenger Checklist forms obtained from Safe Kids Michigan and OHSP child restraint system distribution lists were utilized to assess the impact of CPSTs.

Results show that counties with the highest risk are concentrated in the southern Lower Peninsula of Michigan and the counties with the largest number of CPSTs are also in the Lower Peninsula. The total number of CPSTs in Michigan has been stable around 950, with 140 to 260 new CPSTs in a given year. Only Keweenaw, Alcona, and Montmorency counties had no CPSTs who reported living or working there. In the survey of CPSTs, the response rate was proportional to the distribution of CPSTs by county, suggesting the results provide a good representation of the population of CPSTs. The majority of CPSTs self-identified as white race. Spanish was the most common non-English language spoken by CPSTs. The largest proportions of CPSTs worked in law enforcement, social work/health education, and healthcare. Most CPSTs check only one or two types of child restraint systems. The majority completed five seat checks per month or fewer and on average spent 1 to 5 hours checking seats per month. Of the CPSTs considered "high-activity", most were both paid and volunteered for seat checks and many reported an affiliation with a Safe Kids Coalition. Convenience (i.e., time of day or distance to the event) was the factor with the greatest effect on seat check participation. Most CPSTs believe their clients hear about seat checks by word of mouth, from a website or social media, and from signs posted about the event.

Car seat inspection (or fitting) stations and events were offered primarily in counties throughout the southern Lower Peninsula, with the largest number in metro Detroit and Kent counties. Safe Kids Coalition inspection stations and events resulted in 32,411 seat checks in a four-year timespan. Nearly half of these seat checks resulted in a change in restraint type, installation method, or seat location in the vehicle. Half of seat checks resulted in the provision of a child restraint system. The number of children nine and younger per CPST per county was lowest in Gogebic (166) and highest in Jackson (4618). Forty counties had 1,000 or more children per CPST and were distributed throughout the state. The most services per child were provided in the following OHSP regions: Thumb Area, West Michigan, South Central, Traverse Bay Area, Huron Valley, and Upper Peninsula Regions. The fewest services per child were provided in the Northern Lower, Southwest, Oakland, and Macomb/St. Clair Regions.

## Chapter 1. Background and Objectives

In 2014, over 16,000 children in the state of Michigan aged 9 and under were involved in police-reported motor vehicle crashes (MVCs). Of these, nine were killed, 825 suffered non-fatal injuries and 1,864 sustained possible injuries.<sup>1</sup> The risk of serious or fatal injury in a crash has declined dramatically over the past 40 years, as more children use appropriate restraint systems and child passenger safety laws are strengthened.<sup>2</sup> The Michigan child passenger safety law was last upgraded in 2008, requiring children to use appropriate restraint systems up to age 8.<sup>3</sup> Although the passage of the upgraded law was accompanied by educational efforts to ensure that caregivers select and use appropriate child passenger restraint systems, work to improve child passenger safety is still needed. Motor vehicle crashes remain a leading cause of death among children in Michigan and nationally.<sup>4-6</sup> In 2014, Michigan children 4 to 10 years old had the lowest use of restraints compared with children of other ages involved in police reported crashes.<sup>4</sup> In addition, it is estimated that 50-75% of child restraint systems are used or installed incorrectly.<sup>7-10</sup> Suboptimal child passenger safety behaviors have been associated with poverty, low educational attainment, and minority race/ethnicity.<sup>11-13</sup>

Child Passenger Safety Technicians (CPSTs) play a key role in helping children travel more safely. In the late 1990's, the National Highway Traffic Safety Administration (NHTSA) developed the CPST training program. The program consists of a 3 to 4-day initial training course that teaches participants about the safe transportation of children in motor vehicles through classroom and hands-on activities. Graduates of the program are authorized to educate caregivers to correctly select, install and use child restraint systems. CPSTs maintain their certification on a two-year cycle by earning continuing education units (CEUs) and participating in car seat checks. CPSTs are encouraged to work in teams and with an experienced senior checker, rather than as individuals to assure that caregivers receive quality education and to better address challenging or unique situations that can arise during the course of a car seat check.

The training program is now managed by the National Child Passenger Safety Board<sup>14</sup> and certification is administered by Safe Kids Worldwide.<sup>15</sup> Safe Kids Worldwide serves as a resource for coalitions throughout the United States to promote child safety in a number of realms, including the safety of child passengers. Safe Kids Michigan is a program within the Injury and Violence Prevention Section of the Michigan Department of Health and Human Services. Safe Kids Michigan leads 13 in-state coalitions to create an environment where children are free from accidental injury.<sup>16</sup> The Michigan State Police Office of Highway Safety Planning (OHSP) has received funding from NHTSA to train new CPSTs, provide CEU opportunities to enable CPSTs to maintain their certification, and provide child restraint systems to families in need through car seat checks.

Car seat checks are held throughout the state and can be sponsored by a wide range of organizations including local Safe Kids coalitions, law enforcement agencies, healthcare facilities, county health departments, churches, and retailers. Some car seat checks recur regularly at fixed inspection (or fitting) stations that take appointments or drop-in customers, while some are intermittent or one-time events. The CPST workforce in Michigan is more than 900 strong and includes paid employees and volunteers. However, the distribution and availability of CPSTs and car seat checks across Michigan is unknown. Of particular concern is the potential for the children with the greatest anticipated need for child passenger safety resources to have limited access to car seat checks and CPST services.



The purpose of the current study was to characterize child passenger safety resources in Michigan in terms of quantity, location, and service delivery in relation to the child population that is anticipated to be in greatest need for these resources. In other words, the children at risk for suboptimal child passenger safety behaviors need the resources most. We also sought to analyze the impact of Michigan's CPSTs based on the number of children serviced, changes as the result of a car seat check, and the distribution of child restraint systems. Our objective was to provide OHSP with the information necessary to guide equitable distribution of child passenger safety resources throughout Michigan.

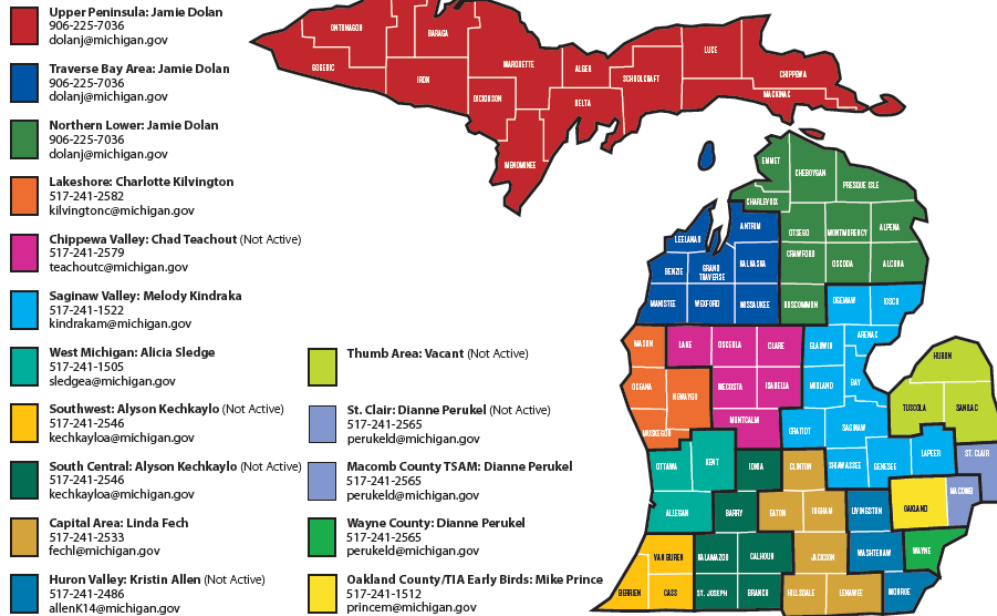
## Chapter 2. Overview of Data Sources and Methods

To achieve our objective, we relied on existing data sources and data collected from CPSTs and Trauma Facilities<sup>17</sup> throughout Michigan. There are 83 counties (Figure 1) and 2767 census tracts in Michigan. Michigan counties are grouped into 15 OHSP Traffic Safety Regions (Figure 2).<sup>18</sup> There are 13 Safe Kids Michigan Coalitions that cover 30 counties (Figure 3).<sup>16</sup> We present results at the county level, census tract level, and in relation to the Traffic Safety Regions and Safe Kids Coalitions. We include a full-page view of each map contained in this report in Appendix C.



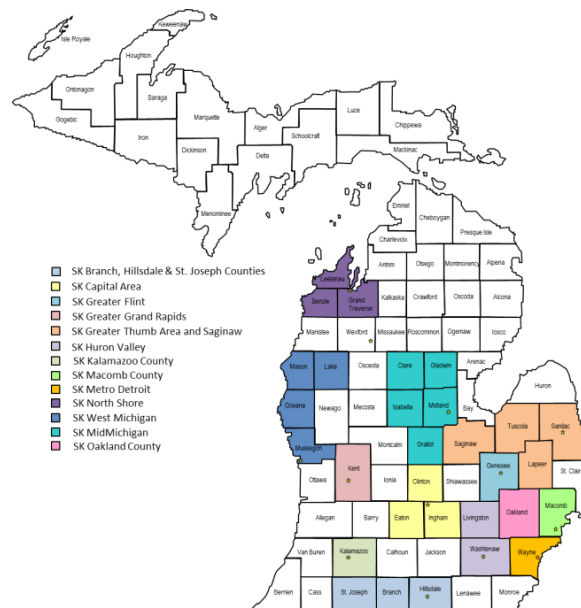
**Figure 1.** Map of Michigan Counties

## Regional Traffic Safety Network



Updated 1-28-2016

**Figure 2.** Michigan Regional Traffic Safety Network



Safe Kid Community Coalitions  
Michigan Department of Community Health  
Injury Prevention Section – 9/2014

**Figure 3.** Counties covered by Safe Kids Michigan Coalitions

We defined the **population “at risk” for preventable injury** due to increased likelihood of suboptimal child passenger safety behaviors using data from the 2010 U.S. Census,<sup>19</sup> the American Community Survey 2009-2013,<sup>20</sup> and the Michigan Crash database 2010 through 2014. The American Community Survey data represent 5-year rolling averages for population characteristics. We utilized principal component analysis for data reduction and key factors were identified. To develop composite risk scores, we tested six different schemes for factor weighting based on literature associating demographic characteristics to suboptimal child passenger safety behaviors and the known association between suboptimal child passenger safety behaviors and risk of injury in crashes. Four of the weighting schemes were adjusted for the county population; one was adjusted for the population of children  $\leq 9$  years.

Information related to **child passenger safety resources** in Michigan from 2010 through 2014 was gathered from OHSP lists of certified CPSTs in Michigan, reports of child restraint systems distributed through OHSP, and *Child Passenger Safety Checklist* forms collected by Safe Kids Michigan (Appendix A).

OHSP provided the study team with annual reports listing certified CPSTs in Michigan for the month of July in 2012, 2013, and 2015 and the month of September in 2014. Reports contained the following information: unique Safe Kids ID for each CPST, home or work address as reported by the CPST, CPST instructor status, Spanish language skills, and training to work with children with special needs.

OHSP also provided the research team with data related to child restraint systems distributed through their community car seat distribution program from 2012 through 2014 in the Lower Peninsula. These data included: 1) *reporting forms* (a CPST-generated single page report of the child restraint systems distributed to families and their Agency/Organization); 2) *half sheets* (a tally of child restraint systems for which OHSP received documentation of distribution); and 3) *child passenger safety checklist forms* (submitted by CPSTs to document their distribution of OHSP-purchased child restraint systems). The number of OHSP seats distributed throughout the Lower Peninsula by county was determined from the reporting forms. OHSP handles child restraint systems distributed in the Upper Peninsula differently. All child restraint systems purchased through a grant from OHSP are distributed through the Kids Always Ride Safe (KARS) project director. We obtained *summary files*, containing the number of OHSP-funded child restraint systems distributed in the Upper Peninsula from 2010 through 2014 and the agency of distribution, directly from the project director.

Safe Kids *Child Passenger Safety Checklist* forms, submitted by CPSTs affiliated with local coalitions to Safe Kids Michigan, were transferred to Safe Kids Worldwide through their standard processes. Safe Kids Worldwide extracted data from the forms using optical recognition software. The research team received an Excel file containing the data and links to electronic copies of the paper forms from Safe Kids Michigan. We assessed the impact of the Safe Kids seat checks by determining if the CPST documented a change in seat type, a change in installation method, or a problem, such as a recalled seat.

The **CPST workforce and provision of services** were characterized using surveys, interviews, and reviews of hospital websites. We conducted an online survey of CPSTs certified in Michigan as of September 29, 2015 (Appendix B). We conducted interviews regarding the location and frequency of car seat checks offered in 2014 with a subset of CPSTs who self-identified as or were known to be coordinators of car seat check services. Given the known association between trauma programs and injury prevention programs, we also determined if Michigan hospitals designated as trauma facilities provide services such as car seat checks or car seat distribution programs by reviewing their websites and contacting their hospital operator.

We attributed Census and American Community Survey data to census tracts and counties based on Federal Information Processing Standard (FIPS) Codes. Agency/Organization locations were determined through searches on Google Maps (Google, Inc., Mountain View, CA). We geocoded the addresses of participants from the Child Passenger Safety Checklist forms, locations of the CPSTs in Michigan, and locations of child passenger safety services using Google Maps Geocoding API (Google Inc., Mountain View, CA) and mapped the geocoded addresses using ArcGIS Desktop 10.3.1 (ESRI, Inc., Redlands, CA).

## Chapter 3. Defining the At Risk Population

### METHODS

We defined **the population with greatest anticipated need** for child passenger safety resources using data from the 2010 U.S. Census, the American Community Survey 2009-2013, and the Michigan Crash database 2010 through 2014. Data are collected for the U.S. Census every 10 years, most recently in 2010. Census data of interest for this assessment included the total population by age, the racial and ethnic composition of the population, total households, households with children under 18, households with children under 5, female headed households, unoccupied housing units, and rental housing units. The U.S. Census categorizes age in 5-year age-groups. We included two age groups in this study, birth to 4 years and 5 to 9 years, as these are the children most likely to benefit from use of a child restraint system and contact with a CPST. The American Community Survey data represent 5-year rolling averages for population characteristics. From the American Community Survey, we examined the following variables: median household income, annual household income (below \$25,000 and between \$25,000 and \$50,000), families with children under 18 living below poverty, families with children younger than 5 living below poverty, households with no vehicle, unemployment, educational attainment (high school education or less), population 5 years and older that speaks Spanish in the home, and population 5 years and older that speaks a language other than English or Spanish in the home.

We utilized principal component analysis to explore the socio-demographic data and we identified five factors: 1) target population; 2) minority race; 3) Hispanic/non-English speaking; 4) poverty; and 5) low educational attainment (Table 1). We discussed variables that contributed to each factor and made adjustments to factors through an iterative process that sought to minimize collinearity.

**Table 1.** Key socio-demographic factors

Factors	Variables
Target population	Population ≤9 years old
Minority race	Black/African American Native American Asian/Pacific Islander
Hispanic/non-English speaking	Hispanic speaks a language other than English “Other” non-white race
Poverty	% Female headed household % Rental housing % Low income threshold(s) <25K, 25 to <50K % Household with no vehicle % Unemployment
Low educational attainment	High school education or less

We also created a factor to represent higher risk of injury in a crash based on data contained in the Michigan Crash Database from 2010 through 2014. Crash data were analyzed to determine the number and location, at the county level, of *crashes* that involved children  $\leq 9$  years old who were injured or killed or were considered at risk for injury because they were improperly restrained or sitting in a front seat. Both non-incapacitating and incapacitating injuries were included in these counts. We considered children improperly restrained if they had any of the following codes indicated in the crash report: 1) no belts used; 2) child restraint not used, unavailable, or improper use; 3) lap belt only; 4) shoulder belt only. We determined counts of crashes per year within the Michigan Crash database and then aggregated crash counts over the 5-years due to small sample sizes of children killed or severely injured in individual years. Crash data were adjusted for the average annual vehicle miles traveled (AVMT) per county based on 2010 to 2013 reports from the Michigan Department of Transportation. We focused our analyses on the county level because county is the level of aggregation for AVMT data.

We evaluated the Annual Direct Observation Survey of Safety Belt Use 2011, 2012, and 2014 for inclusion as a measure of the proportion of unrestrained drivers per county, because there is a strong association between unrestrained drivers and unrestrained child passengers.<sup>13</sup> Ultimately, we determined that this information would not be useful in our analyses as data were only available for 32 or 33 of the 83 counties in Michigan depending on the year.<sup>21</sup>

We created index scores for each factor based on the distribution of the measure across counties. We then used the index scores to develop composite risk scores as measures of the **population “at risk” for preventable injury**. We tested six different weighting schemes (Table 2) for the factors based on literature associating demographic characteristics to child passenger safety behaviors and the risk of injury associated with suboptimal child passenger safety behaviors. Risk Scores 1 through 4 were adjusted for the total county population. Score 5 was scaled to range from 0 to 100 and adjusted for the child population  $\leq 9$  years without including the target population as a factor in the score calculation.

**Table 2.** Variables and weighting schemes to calculate composite Risk Scores

Factor	Variables	Risk Score					
		0*	1	2	3	4	5**
U.S. Census/American Community Survey data		Variable Weights					
Target population	Population 9 and under	0.25	0.25	0.30	0.30	0.30	0
Minority race	All non-white except ‘other’ non-white	0.15	0.15	0.20	0.15	0.10	0.20
Hispanic/non-English speaking	Hispanic, non-English speaking, and other non-White	0.15	0.15	0.20	0.15	0.10	0.20
Poverty	% Female headed household % Rental housing % Low income thresholds <25K, 25-49K % Household with no vehicle % Unemployment	0.10	0.10	0.15	0.15	0.10	0.15
Low education	High school education or less	0.10	0.10	0.15	0.10	0.10	0.15
Crash data							
CRASH	Crash involving a child 9 and younger who was injured, killed, improperly restrained, or sitting in the front seat	0.25	0.25	0	0.15	0.30	0.30

\*Score 0 not population adjusted; \*\*Score 5 excludes the “target population” factor, adjusted for child population

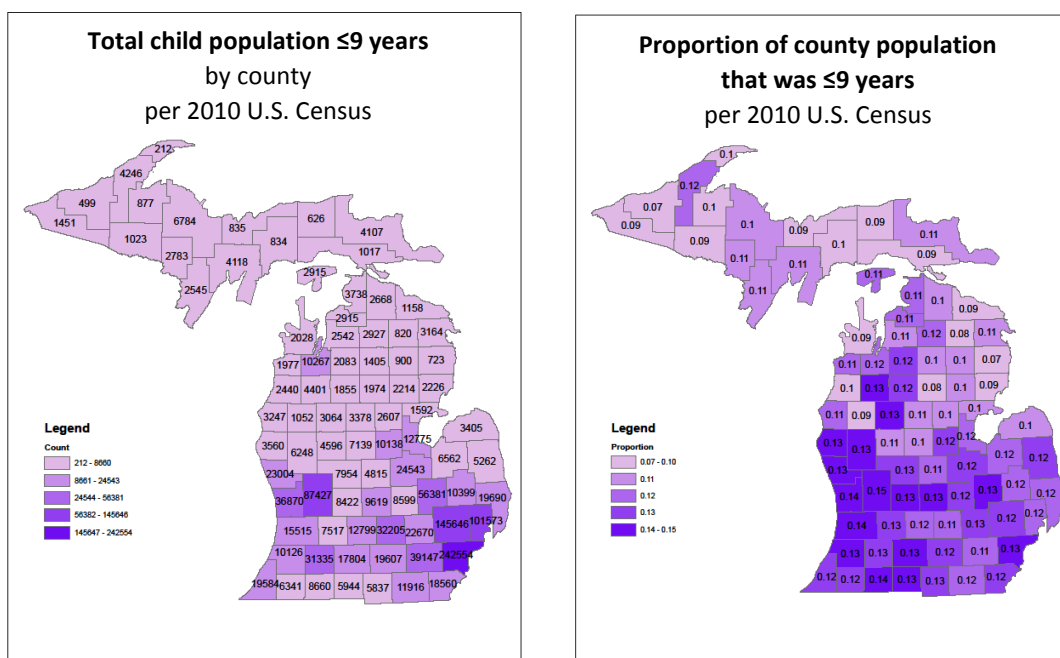
We appraised the changes in county-level Risk Scores across the six weighting schemes. For this report, we focus on and present maps for two Risk Scores, Score 1 and Score 5. We selected Score 1 because it includes the crash factor and places greater weight on race/ethnicity than on poverty and low educational attainment, adjusting for the total county population. Research suggests a persistent association between suboptimal restraint use and non-white race/non-Hispanic ethnicity after adjusting for socioeconomic status<sup>12</sup> and the potential for the provision of child restraint systems to overcome some of the barriers to child restraint system use in low-income populations.<sup>22</sup> We selected Score 5 in order to examine the effect of removing the target population factor from the score and applying the Score to each county and census tract adjusting for the population of children  $\leq 9$  years in those areas. Score 5 is similar to Score 1 in the distribution of weights for the other factors.

We generated maps in ArcGIS to illustrate the distribution of variables contributing to each factor, the distribution of Scores 1 and 5 across counties, relative risk (county score divided by state mean score) using Score 5, and distribution of Score 5 across census tracts. Map labels include numeric values of counts, proportions, index scores and the composite Risk Scores. We used natural breaks or quintiles to set the color-shading schemes for each map. We mapped and analyzed these data at the county level because some data were available only at the county level, e.g., AVMT and because counties define the regions within which child passenger safety services were organized.

## RESULTS

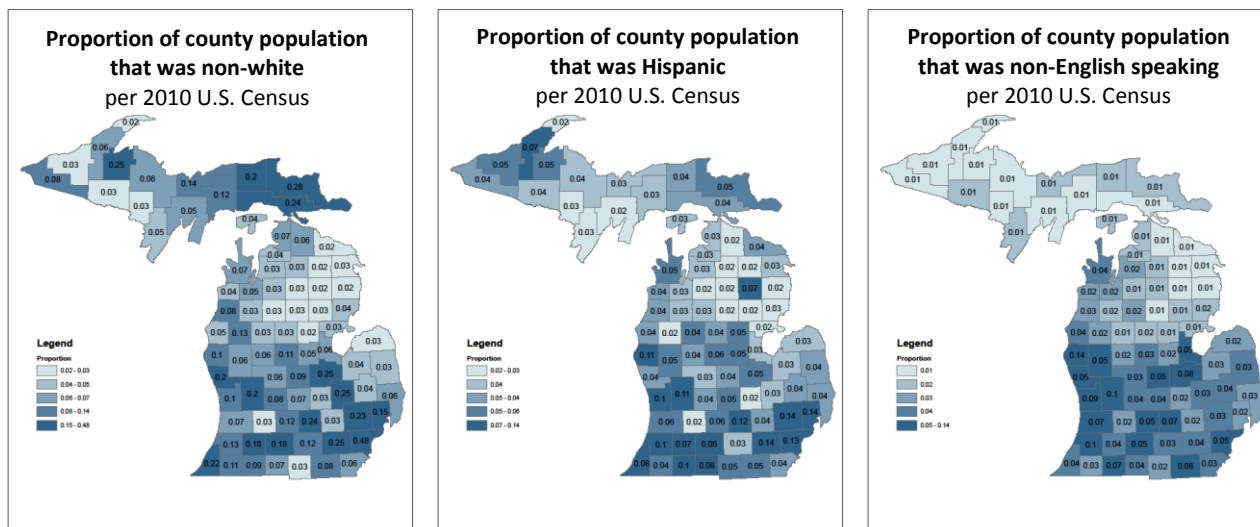
### Factor Variables

According to the 2010 U.S. Census there were more than 1.2 million children 9 years and younger living in Michigan. Figure 4 shows the distribution of children  $\leq 9$  years old by county. While southeast Michigan has the counties with the largest child populations, the western Lower Peninsula contains a number of counties where relatively high proportions of their populations are young children.



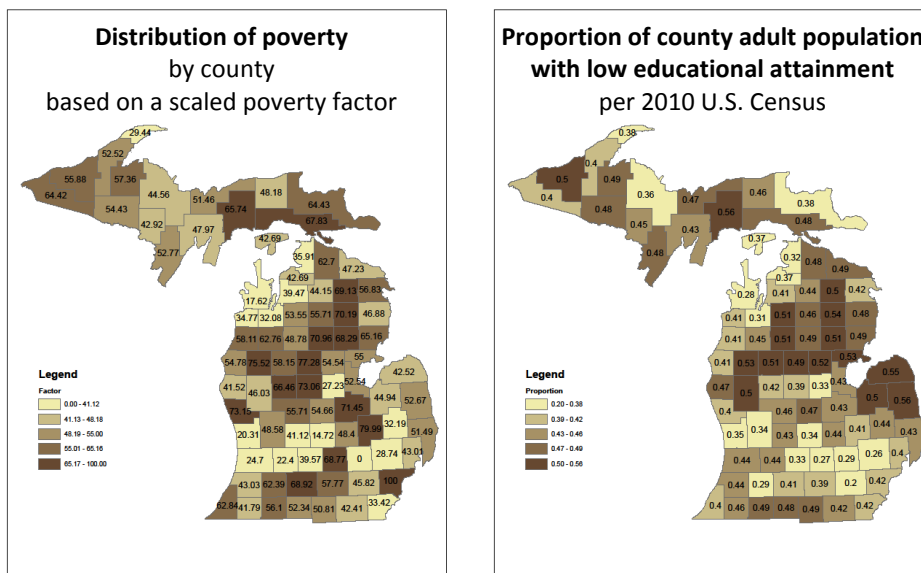
**Figure 4.** Distribution of child population  $\leq 9$  years by county

Figure 5 presents the proportion of each county population from a minority racial background (left), Hispanic ethnicity (center), or non-English speaking (right). The counties with higher proportions of population that was non-white race primarily contain large urban areas (e.g., Wayne, Genesee, Saginaw, Kalamazoo, and Kent) or are located in the eastern Upper Peninsula. The counties with higher proportions of population that was Hispanic show a similar pattern but also are located in agricultural areas along the western Lower Peninsula. Counties with higher proportions of their population that were non-English speaking are more concentrated in the southern half of the Lower Peninsula.



**Figure 5.** Distribution of minority and non-English speaking populations by county

Figure 6 illustrates the distribution of populations with greater poverty based on a scaled poverty factor and the proportions of the county adult population with low educational attainment. Counties with higher scaled poverty scores were distributed throughout the state. However, low educational attainment was most prevalent in the Thumb region and across the northern Lower Peninsula.



**Figure 6.** Distribution of poverty and low educational attainment by county

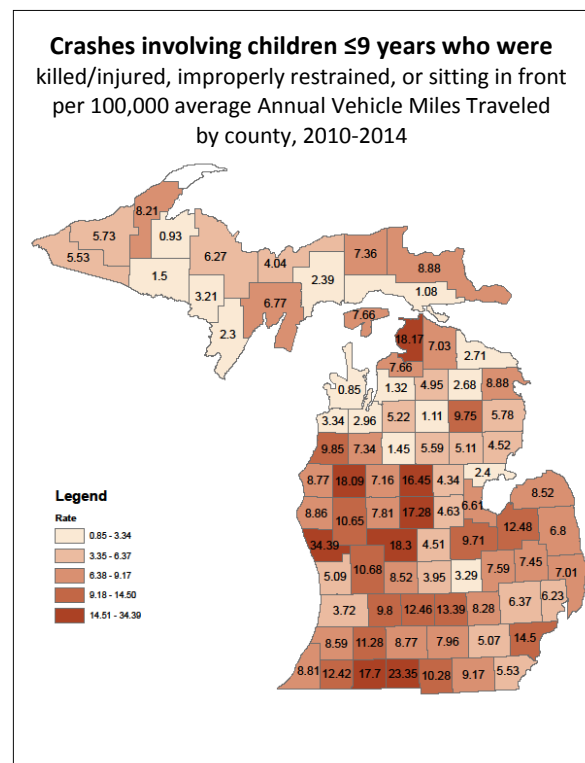
In the 2010 to 2014 Michigan Crash Database, 45,506 crash records included a passenger  $\leq 9$  years old (10% of 459,489 total crash records). There was an increase from 2010 to 2014 in the total number of crashes involving child passengers  $\leq 9$  years old who were killed, injured, improperly restrained or sitting in the front seat (Table 3).

**Table 3.** Crashes in Michigan over 5 years

Year	2010	2011	2012	2013	2014
Crashes involving a child $\leq 9$ years old who was killed, injured, improperly restrained or in the front	1,569	1,615	1,739	1,794	2,161
Total crashes†	282,075	284,049	273,891	289,061	298,699
Total fatal crashes†	937	889	936	951	876
Fatal crashes involving children birth to 10 years†	19	13	22	15	11

†Data obtained from the Summary of Traffic Crashes on Michigan Roadways in Calendar Year 2014<sup>23</sup>

Of the 45,506 crashes with children  $\leq 9$  years old, 8,879 (19.5%) included child passengers who were killed, injured, or considered at risk for injury based on our study criteria. In the 5 years, there were 60 fatal injuries, 643 incapacitating injuries, and 2,350 non-incapacitating injuries. In 6,229 crashes, a child was seated where no belts were available. In 3,026 crashes, a child was improperly restrained [i.e., used only a shoulder belt (183), used only a lap belt (1,315), used no belts (706), or a child restraint was not used, unavailable or was used improperly (999)]. Children  $\leq 9$  years old were in the driver seat in 291 crashes, in the front middle seat in 307, and in the front passenger seat in 1,016 crashes. Crashes involving children injured or at risk for injury were normalized per 100,000 average (calculated from 2010-2013 data) AVMT per county and were mapped at the county level (Figure 7). When mapped, the density of crashes aligned with population centers and along major highways.



**Figure 7.** Distribution of crashes with a child injured or at risk for injury by county



## Risk Score Assessment

Table 4 compares the composite Risk Scores at the county level across the six factor weighting schemes. Higher scores represent a greater potential risk for preventable injury in motor vehicle collisions due to increased likelihood of suboptimal child passenger safety behaviors. Using the weighting scheme for Score 5, the state-wide mean risk score at the county level was 32.73 (Standard Deviation (SD) 17.6) and the state-wide mean risk score at the census tract level was 37.15 (SD 19.52). Table 4 is sorted from highest to lowest Risk Score, using the weighting scheme for Score 5. Score 5 was scaled to range from 0 (lowest risk) to 100 (highest risk). The cells in Table 4 are highlighted red for the highest scores, yellow for mid-range scores, and green for the lowest scores. The greatest change in the ranking of counties according to their composite Risk Scores was with the adjustment for total county population (Score 0 to Score 1) and with the adjustment for the population of children  $\leq 9$  years (Score 1 to Score 5).

**Table 4.** Comparison of Risk Scores by county

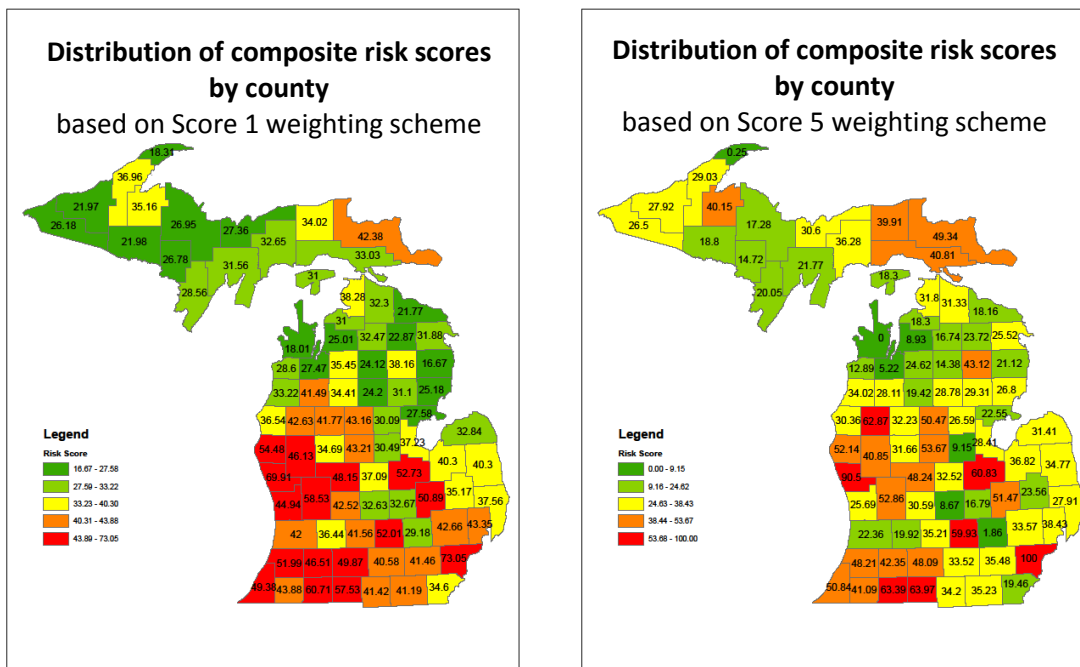
County	Score 0	Score 1	Score 2	Score 3	Score 4	Score 5
Wayne	85.17	73.05	83.68	78.23	70.81	100
Muskegon	30.53	69.91	59.2	67.84	75.67	90.5
Branch	18.08	57.53	53.76	57.57	62.67	63.97
St. Joseph	14.61	60.71	63.31	63.25	64.44	63.39
Lake	13.11	42.63	41.42	42.85	45.05	62.87
Saginaw	13.51	52.73	61.38	57.24	52.75	60.83
Ingham	18.71	52.01	56.33	54.79	50.85	59.93
Isabella	13.97	43.21	41.91	44.21	45.56	53.67
Kent	29.66	58.53	66.39	63.03	59.16	52.86
Oceana	6.91	54.48	63.74	58.46	54.81	52.14
Genesee	18.79	50.89	60.65	57.08	52.38	51.47
Berrien	11	49.38	57.42	53.87	49.96	50.84
Clare	12.39	43.16	42.87	45.1	47.56	50.47
Chippewa	7.07	42.38	48.7	45.77	42.08	49.34
Montcalm	14.7	48.15	46.46	49.5	53.32	48.24
Van Buren	8.42	51.99	60.64	56.06	52.63	48.21
Calhoun	10.26	49.87	58.01	55.05	51.54	48.09
Oscoda	6.82	38.16	43.18	41.42	40.92	43.12
Kalamazoo	15.24	46.51	50.6	50.26	48.04	42.35
Cass	10.07	43.88	46.57	46.02	46.94	41.09
Newaygo	8.71	46.13	51.27	49.48	49.57	40.85
Mackinac	0.45	33.03	45.15	37.96	31.24	40.81
Baraga	0.27	35.16	47.69	40.08	33.59	40.15
Luce	4.98	34.02	39.7	36.28	34.07	39.91
Macomb	29.55	43.35	51.79	47.36	43.55	38.43

County	Score 0	Score 1	Score 2	Score 3	Score 4	Score 5
Tuscola	10.09	40.3	42.16	42.35	44.52	36.82
Schoolcraft	1.34	32.65	43.4	37.51	33.34	36.28
Washtenaw	13.9	41.46	49.85	45.5	38.86	35.48
Lenawee	9.1	41.19	46.16	44.2	43.25	35.23
Eaton	11.64	41.56	42.91	43.42	43.73	35.21
Sanilac	5.61	40.3	47.99	44.7	43.74	34.77
Hillsdale	8.23	41.42	45.56	44.88	45.71	34.2
Manistee	7.29	33.22	35.93	35.51	35.14	34.02
Oakland	41.47	42.66	49.82	45.94	41.43	33.57
Jackson	9.73	40.58	46.52	44.91	43.1	33.52
Gratiot	3.88	37.09	45.96	41.73	38.44	32.52
Osceola	5.31	41.77	49.13	46.85	46.02	32.23
Emmet	13.64	38.28	32.95	37.97	42.86	31.8
Mecosta	6.19	34.69	39.73	38.55	37.14	31.66
Huron	6.51	32.84	36.93	35.01	35.76	31.41
Cheboygan	5.22	32.3	37.77	35.87	34.77	31.33
Alger	2.57	27.36	34.56	30.31	27.29	30.6
Ionia	7.49	42.52	48.06	46.45	46.02	30.59
Mason	6.63	36.54	40.74	39.89	39.19	30.36
Ogemaw	3.67	31.1	38.31	35.52	33.68	29.31
Houghton	6.36	36.96	41.68	40.54	39.63	29.03
Roscommon	4.05	24.2	29.46	27.26	25.54	28.78
Bay	7.25	37.23	43.65	41.46	39.85	28.41
Wexford	5.68	41.49	48.18	47.02	46.17	28.11
Ontonagon	3.75	21.97	26.45	23.79	22.5	27.92
St. Clair	8.94	37.56	43.58	41.75	40.6	27.91
Iosco	3.3	25.18	31.51	28.6	26.44	26.8
Gladwin	3.2	30.09	37.55	34.02	32.22	26.59
Gogebic	3.82	26.18	31.33	29.42	27.08	26.5
Ottawa	11.63	44.94	53.66	49.36	46.21	25.69
Alpena	6.65	31.88	34.76	34.91	35.25	25.52
Kalkaska	3.66	35.45	42.9	40.33	39.34	24.62
Montmorency	1.54	22.87	30.46	26.92	24.06	23.72
Lapeer	7.19	35.17	39.8	38.08	38.07	23.56
Arenac	1.5	27.58	36.22	32.02	29.62	22.55
Allegan	5.54	42	51.58	47.01	44.55	22.36

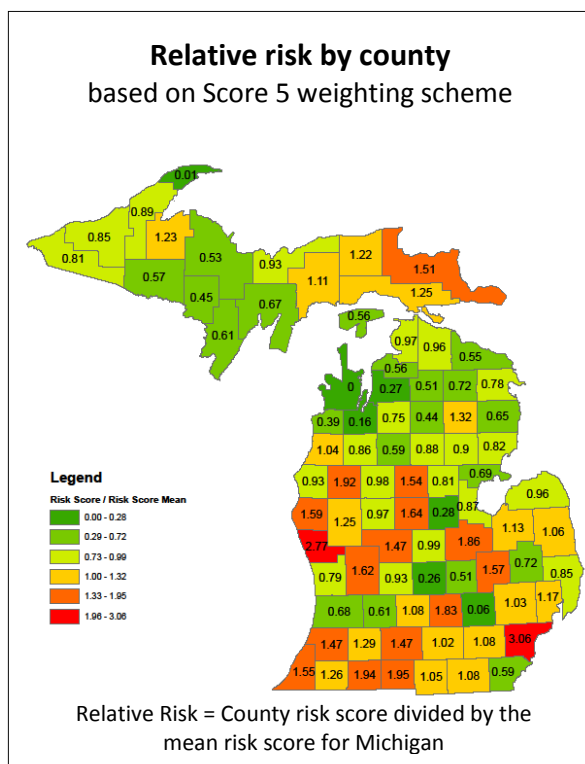
County	Score 0	Score 1	Score 2	Score 3	Score 4	Score 5
Delta	5.28	31.56	36.14	35.04	34.69	21.77
Alcona	3.85	16.67	19.4	17.54	17.23	21.12
Menominee	1.64	28.56	37.15	33.29	30.72	20.05
Barry	8.11	36.44	38.6	38.75	41.08	19.92
Monroe	7.43	34.6	40.73	38.43	37.58	19.46
Missaukee	0.8	34.41	45.04	40.39	37.6	19.42
Iron	0.72	21.98	30.02	25.81	22.81	18.8
Charlevoix	5.65	31	34.11	34.03	34.18	18.3
Presque Isle	1.65	21.77	28.43	24.87	22.96	18.16
Marquette	5.51	26.95	30.55	29.79	29	17.28
Shiawassee	3.58	32.67	40.7	37.88	35.96	16.79
Otsego	3.61	32.47	38.73	36.94	36.24	16.74
Dickinson	2.34	26.78	33.55	30.77	29.37	14.72
Crawford	0.47	24.12	32.62	28.97	26.15	14.38
Benzie	2.24	28.6	35.24	32.56	31.06	12.89
Midland	4.83	30.49	35.61	34.22	33.22	9.15
Antrim	0.87	25.01	32.75	29.49	27.17	8.93
Clinton	4.24	32.63	38.72	36.34	35.15	8.67
Grand Traverse	3.61	27.47	33.39	31.73	30.05	5.22
Livingston	9.57	29.18	29.45	30.71	33.27	1.86
Keweenaw	0	18.31	24.4	21.82	20.35	0.25
Leelanau	0.44	18.01	23.53	20.63	17.96	0

Figure 8 shows the distribution of the composite risk scores by county based on Score 1 (left) and Score 5 (right). The counties with the 5 highest composite Risk Scores based on Score 1 were located in South Central region (Branch, St. Joseph), West Michigan region (Kent), Lakeshore region (Muskegon), and Wayne County. The counties with the 5 lowest composite Risk Scores based on Score 1 were located in the Traverse Bay Area region (Leelanau), Northern Lower region (Alcona, Presque Isle) and Upper Peninsula (Keweenaw, Ontonagon). When using Score 5, which adjusts for the population of children  $\leq 9$  years in the county, we observe changes in the county rankings for the 5 highest and 5 lowest risk scores. Lake County moved into the 5 highest risk scores and Kent County ranked 9th. Grand Traverse, Livingston, and Clinton Counties replaced Alcona, Presque Isle, and Ontonagon Counties for the 5 lowest risk scores.

Figure 9 shows relative risk scores for each county. Relative risk scores ranged from a high of 3.06 for Wayne County to a low of 0 for Leelanau County. Muskegon and Wayne Counties were more than 2.5 SD above the average risk score for the state. Lake, Saginaw, Ingham, St. Joseph and Branch Counties were 1.5-2.5 SD above the average risk score for the state. Keweenaw, Leelanau, Grand Traverse, and Livingston Counties were more than 1.5 SD below the average risk score for the state.

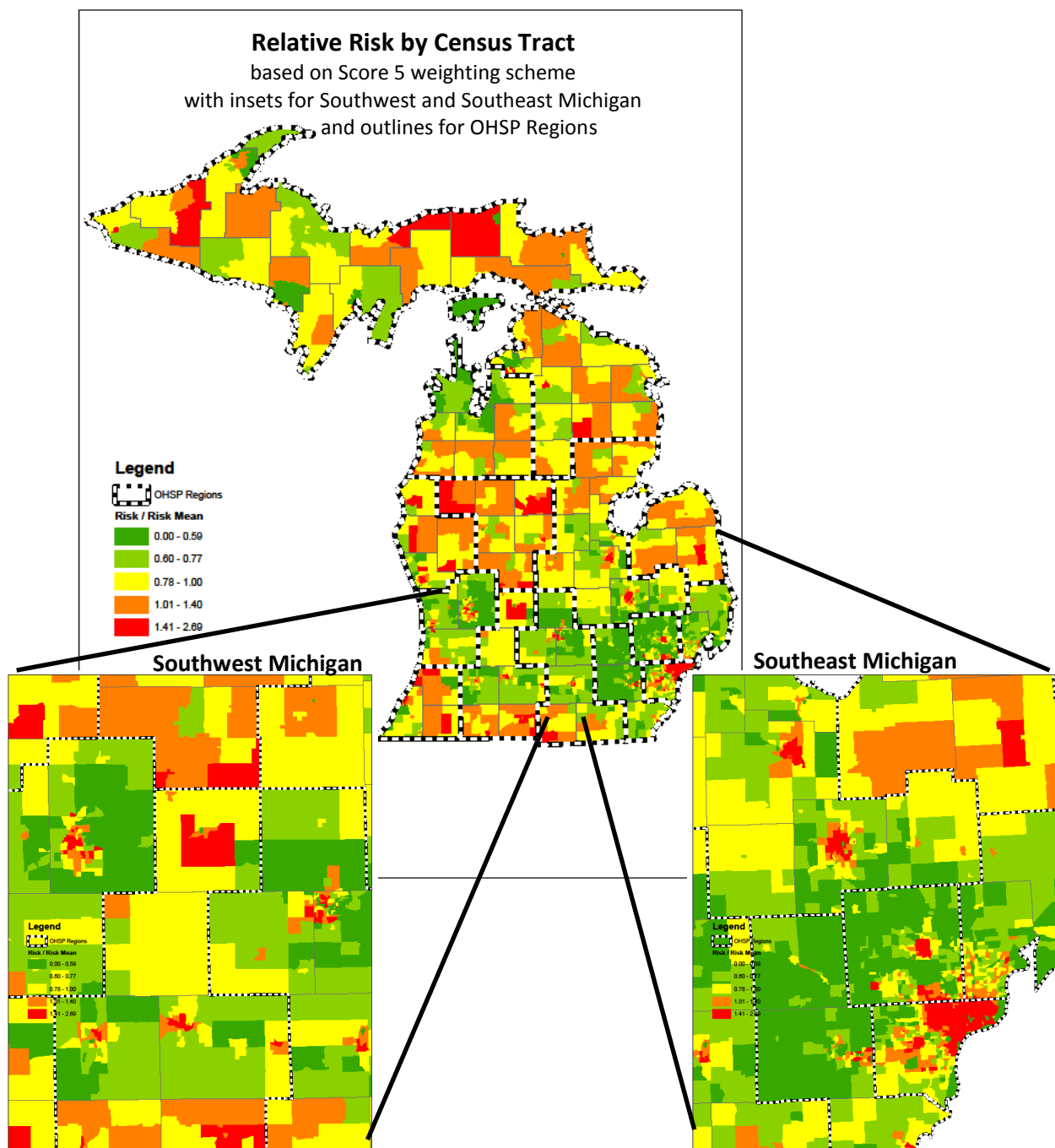


**Figure 8.** Distribution of composite risk scores by county; Score 1 and Score 5



**Figure 9.** Relative risk by county; Score 5

Figure 10 shows relative risk scores applied to census tracts and demonstrates that county-level aggregation obscures smaller areas of higher or lower risk for suboptimal child passenger safety.



**Figure 10.** Relative risk by census tract; Score 5

## **Chapter 4. Number and Location of Michigan Child Passenger Safety Technicians**

### **METHODS**

We received lists from OHSP of the certified CPSTs in Michigan in the months of July 2012, July 2013, September 2014 and July 2015. Lists included the CPST's Safe Kids ID, their home or work address as reported by the CPST, and indicators of additional specialization including CPST Instructor (CPST-I) status, instructor candidate, technician proxy, Spanish language skills, and training to work with children with special needs.

CPST Instructors are experienced technicians who have sufficient training to teach the CPST Certification Course. Those interested in becoming a CPST-I complete an application process and submit a \$75 fee. Once approved as an instructor candidate, the CPST spends a period of time (less than one year) receiving mentorship and undergoing evaluation to determine if the candidate is prepared to take on the instructor role. Technician proxy is a role that was created by Safe Kids Worldwide to bridge the gap in parts of the country where there are few certified instructors. Technician proxies must be certified CPSTs for at least 6 months before they can submit an application with a small fee and two testimonials attesting to their ability to provide suitable feedback and pass/fail seat checks appropriately. Once approved, technician proxies can review and approve seat checks for recertification.

CPST lists from all years were included in our assessment of the counties in which new CPSTs were certified during the study period and for results examining changes in the number of CPST per county over time. CPSTs were considered newly certified if their Safe Kids ID was not present in the 2012 dataset. The CPST list from 2014 was selected for presentation of the summary results due to the ability to relate the 2014 information to other datasets obtained for this study from that year.

CPST addresses (business or home) contained in these files were geocoded using Google Maps Geocoding API (Google Inc., Mountain View, CA) and mapped the at the county level using ArcGIS Desktop 10.3.1 (ESRI, Inc., Redlands, CA). The vast majority (90%) of addresses were geocoded on the first attempt. The study team completed hand correction of addresses that mapped to a locality, natural feature, or sub-premise. Results are organized by county within Traffic Safety Network Regions. We also indicate counties that are covered by a Safe Kids Michigan Coalition.

### **RESULTS**

#### **CPST Counts and Locations from 2012 to 2015**

The OHSP files contained information for more than 900 CPSTs in each year (Table 5). The total number of CPSTs has increased from 2012 to 2015 by 32 while the number of CPSTs with specialization remained stable. Table 5 also provides annual counts of CPSTs with new certifications, instructor status, instructor candidates and technician proxies, special needs training, and Spanish language skills per year.

Overall, 85% of CPSTs provided a business address in the OHSP lists. There were 43 technicians with a geocoded business or home address for whom there was a change in the county location of their address during the study period. Twenty-four address differences were for the same agency; 13 of these represented different Michigan State Police posts. Six CPST had a different address with a different agency, 4 changed between listing business or another address, and 3 listed different non-business addresses. We were unable to determine the type of change for 6 addresses. Most of the

CPSTs with different addresses in different years provided addresses that mapped to adjacent counties (28 of 43, 65%).

**Table 5.** Counts of Michigan CPSTs by year

	2012	2013	2014	2015
<b>Total CPSTs</b>	941	960	980	973
New Certifications*	n/a	261	228	141
<b>CPST Instructors</b>	49	49	49	46
Instructor Candidates	0	2	1	2
<b>CPSTs with Other Specialization</b>				
Technician Proxy	4	8	15	14
Training to work with children with special needs	62	67	56	66
Spanish language skills	16	21	15	13

\*As determined by the addition of a unique Safe Kids ID not present in prior years

The counts of CPSTs and CPST-Is per county per year and the change in total number of CPSTs within counties between 2012 and 2015 are presented in Table 6. No CPSTs provided a business or home address that was located in Alcona, Keweenaw, or Montmorency counties from 2012 to 2015. At least one technician proxy was located in Kent, Wayne, and Oakland counties in all 4 years; in Muskegon, Montcalm, Hillsdale, and Washtenaw counties in 3 years; in Newaygo, Ottawa, and Calhoun counties in 2 years; and in Grand Traverse and Lenawee in 1 year. Comparing total number of CPSTs in 2015 to 2012 by county, we found 45 counties had a decrease in total number of CPSTs, 30 counties had an increase, and 5 counties had no change. The four counties with the greatest losses of CPSTs were Gladwin (-11), Berrien (-8), Branch (-8), and Marquette (-8). The five counties with the greatest gains were Oakland (+40), Kent (+15), Macomb (+14), Calhoun (+8), and Allegan (+8). The 5 counties with no change in number of CPSTs between 2012 and 2015 were Antrim, Cass, Manistee, Mecosta, and Otsego.

**Table 6.** Change in CPST and CPST-I\* counts by county

County	2012		2013		2014		2015		Change 2012 to 2015
	CPSTs	CPST-I	CPST	CPST-I	CPST	CPST-I	CPST	CPST-I	CPST&CPST-I
<b>1. Upper Peninsula</b>									
Alger	4	0	3	0	4	0	1	0	-3
Baraga	2	0	1	0	5	0	5	0	+3
Chippewa	1	1	2	0	2	0	4	0	+2
Delta	4	0	3	0	3	0	5	0	+1
Dickinson	2	0	1	0	2	0	3	0	+1
Gogebic	5	0	5	0	8	0	9	0	+4
Houghton	5	1	4	1	9	1	10	1	+5
Iron	3	0	2	0	1	0	1	0	-2
Keweenaw	0	0	0	0	0	0	0	0	0
Luce	4	0	2	0	1	0	1	0	-3
Mackinac	2	0	3	0	3	0	4	0	+2
Marquette	26	2	23	2	19	1	18	2	-8
Menominee	4	0	2	0	1	0	2	0	-2
Ontonagon	2	0	2	0	2	0	3	0	+1
Schoolcraft	5	0	3	0	2	1	2	1	-2

2 Traverse Bay Area									
	2012		2013		2014		2015		Change
County	CPSTs	CPST-I	CPST	CPST-I	CPST	CPST-I	CPST	CPST-I	CPST & CPST-I
Antrim	3	0	5	0	5	0	3	0	0
Benzie**	4	1	4	0	3	0	3	0	-1
Grand Traverse**	20	1	18	1	14	1	15	1	-5
Kalkaska	1	0	2	0	1	0	0	0	-1
Leelanau**	2	0	2	0	2	0	1	0	-1
Manistee	3	0	1	0	1	0	3	0	0
Missaukee	1	0	0	0	2	0	2	0	+1
Wexford	5	0	7	0	5	0	3	0	-2
3. Northern Lower									
Alcona	0	0	0	0	0	0	0	0	0
Alpena	5	1	4	1	5	1	4	1	-2
Charlevoix	2	0	2	0	2	0	3	0	+1
Cheboygan	1	0	1	0	2	0	2	0	+1
Crawford	2	0	1	0	1	0	1	0	-1
Emmet	10	1	7	0	5	0	5	0	-4
Montmorency	0	0	0	0	0	0	0	0	0
Oscoda	3	0	1	0	1	0	0	0	-3
Otsego	3	1	3	1	3	1	4	0	0
Presque Isle	3	0	1	0	1	0	1	0	-2
Roscommon	5	0	5	0	3	0	3	0	-2
4. Lakeshore									
Mason**	1	0	4	0	4	0	5	1	+5
Muskegon**	16	0	19	0	16	0	11	0	-5
Newaygo	14	0	11	0	9	0	9	0	-5
Oceana**	9	1	10	1	9	1	9	0	-1
5. Chippewa Valley									
Clare**	2	0	2	0	1	0	1	0	-1
Isabella**	8	0	4	1	5	1	6	1	-1
Lake**	0	0	0	0	1	0	1	0	+1
Mecosta	9	0	3	0	9	0	9	0	0
Montcalm	9	0	13	0	13	0	11	0	+2
Osceola	2	0	1	0	7	0	6	0	+4
6. Saginaw Valley									
Arenac	1	0	2	0	3	0	2	0	-1
Bay	11	0	8	0	13	0	13	0	+2
Genesee**	29	1	42	1	23	1	18	1	-11
Gladwin**	1	0	1	0	1	0	0	0	-1
Gratiot**	5	0	4	0	4	0	4	0	-1
Iosco	3	0	1	0	1	0	1	0	-2
Lapeer**	4	0	5	0	5	0	3	0	-1
Midland**	6	0	7	0	7	0	9	0	+3
Ogemaw	0	0	2	0	5	0	4	0	+4
Saginaw**	15	0	8	0	14	0	18	0	+3
Shiawassee	3	0	6	0	5	0	2	0	-1
7. Thumb Area									
Huron	3	0	1	0	1	0	1	0	-2
Sanilac**	4	2	2	2	1	2	1	2	-3
Tuscola**	14	1	12	1	10	1	8	1	-6
8. West Michigan									
Allegan	6	1	9	0	14	0	14	1	+8
Kent**	79	4	106	4	106	4	94	4	+15
Ottawa	24	1	27	1	25	1	29	1	+5



9. Southwest									
	2012		2013		2014		2015		Change
County	CPSTs	CPST-I	CPST	CPST-I	CPST	CPST-I	CPST	CPST-I	CPST & CPST-I
Berrien	15	1	10	1	10	1	7	1	-8
Cass	10	0	9	0	7	0	10	0	0
Van Buren	11	1	13	1	12	1	7	1	-4
10. South Central									
Barry	5	0	7	0	10	0	10	0	+5
Branch**	13	0	13	0	5	0	5	0	-8
Calhoun	11	0	14	0	17	0	19	0	+8
Ionia	4	0	2	0	3	0	3	0	-1
Kalamazoo**	42	3	41	4	40	4	47	2	+4
St. Joseph**	9	0	10	0	6	1	6	1	-2
11. Capital Area									
Clinton**	7	0	4	0	4	0	6	0	-1
Eaton**	7	0	3	0	3	0	5	0	-2
Hillsdale**	7	0	6	0	4	0	4	0	-3
Ingham**	29	3	23	3	25	2	25	2	-5
Jackson	4	0	4	0	3	0	5	0	+1
Lenawee	8	0	5	0	5	0	5	0	-3
12. Huron Valley									
Livingston**	15	2	16	2	13	2	16	2	-1
Monroe	12	0	12	0	8	0	7	0	-5
Washtenaw**	40	6	45	8	49	7	43	7	-4
13. Wayne County									
Wayne**	80	5	83	6	92	4	86	4	+5
14. Oakland County									
Oakland**	94	3	109	3	125	6	131	6	+40
15. Macomb/St. Clair Counties									
Macomb**	45	6	46	6	55	4	61	4	+14
St. Clair	4	0	4	0	4	0	5	0	+1

\*CPST-I counts include CPST instructors and instructor candidates. \*\*Safe Kids covered county.

Table 7 shows, by county, the availability of any CPST and any CPST who reported instructor status or additional skills at any point from 2012 to 2015. CPSTs trained to work with children with special needs were present in 27 counties and Spanish speaking CPSTs were present in 15 counties during at least one year in the study period.

**Table 7.** Presence of CPSTs and CPSTs with additional skills by county, 2012-2015

County	Any CPSTs	Any CPST-I	Special Needs	Spanish Speaking
	2012-2015	2012-2015	2012-2015	2012-2015
1. Upper Peninsula				
Alger	YES	NO	NO	NO
Baraga	YES	NO	NO	NO
Chippewa	YES	YES	NO	NO
Delta	YES	NO	NO	NO
Dickinson	YES	NO	NO	NO
Gogebic	YES	NO	NO	NO
Houghton	YES	YES	YES	NO
Iron	YES	NO	NO	NO
Keweenaw	NO	NO	NO	NO
Luce	YES	NO	NO	NO

	Any CPSTs	Any CPST-I	Special Needs	Spanish Speaking
Mackinac	YES	NO	NO	NO
Marquette	YES	YES	YES	NO
Menominee	YES	NO	NO	NO
Ontonagon	YES	NO	NO	NO
Schoolcraft	YES	YES	YES	NO
2. Traverse Bay Area				
Antrim	YES	NO	NO	NO
Benzie**	YES	YES	NO	NO
Grand Traverse**	YES	YES	YES	NO
Kalkaska	YES	NO	NO	NO
Leelanau**	YES	NO	NO	NO
Manistee	YES	NO	NO	NO
Missaukee	YES	NO	NO	NO
Wexford	YES	NO	NO	NO
3. Northern Lower				
Alcona	NO	NO	NO	NO
Alpena	YES	NO	NO	NO
Charlevoix	YES	NO	NO	NO
Cheboygan	YES	NO	NO	NO
Crawford	YES	NO	NO	NO
Emmet	YES	YES	YES	NO
Montmorency	NO	NO	NO	NO
Oscoda	YES	NO	NO	NO
Otsego	YES	YES	YES	NO
Presque Isle	YES	NO	NO	NO
Roscommon	YES	NO	NO	NO
4. Lakeshore				
Mason**	YES	YES	NO	NO
Muskegon**	YES	NO	YES	YES
Newaygo	YES	NO	NO	YES
Oceana**	YES	YES	NO	YES
5. Chippewa Valley				
Clare**	YES	NO	NO	YES
Isabella**	YES	YES	NO	NO
Lake**	YES	NO	NO	NO
Mecosta	YES	NO	NO	NO
Montcalm	YES	NO	NO	NO
Osceola	YES	NO	NO	NO
6. Saginaw Valley				
Arenac	YES	NO	NO	NO
Bay	YES	NO	NO	YES
Genesee**	YES	YES	YES	NO
Gladwin**	YES	NO	NO	NO
Gratiot**	YES	NO	NO	NO
Iosco	YES	NO	NO	NO
Lapeer**	YES	NO	NO	NO
Midland**	YES	NO	YES	NO
Ogemaw	YES	NO	NO	NO
Saginaw**	YES	NO	NO	NO
Shiawassee	YES	NO	NO	NO
7. Thumb Area				
Huron	YES	NO	NO	NO
Sanilac**	YES	YES	YES	NO
Tuscola**	YES	YES	YES	NO

8. West Michigan				
	Any CPSTs	Any CPST-I	Special Needs	Spanish Speaking
Allegan	YES	YES	YES	YES
Kent**	YES	YES	YES	YES
Ottawa	YES	YES	YES	YES
9. Southwest				
Berrien	YES	YES	NO	YES
Cass	YES	NO	NO	NO
Van Buren	YES	YES	NO	NO
10. South Central				
Barry	YES	NO	NO	NO
Branch**	YES	NO	YES	NO
Calhoun	YES	NO	YES	YES
Ionia	YES	NO	NO	NO
Kalamazoo**	YES	YES	YES	YES
St. Joseph**	YES	YES	NO	NO
11. Capital Area				
Clinton**	YES	NO	YES	NO
Eaton**	YES	NO	NO	NO
Hillsdale**	YES	NO	NO	NO
Ingham**	YES	YES	YES	NO
Jackson	YES	NO	YES	NO
Lenawee	YES	NO	YES	NO
12. Huron Valley				
Livingston**	YES	YES	YES	NO
Monroe	YES	NO	YES	NO
Washtenaw**	YES	YES	YES	YES
13. Wayne County				
Wayne**	YES	YES	YES	YES
14. Oakland County				
Oakland**	YES	YES	YES	YES
15. Macomb/St. Clair Counties				
Macomb**	YES	YES	YES	YES
St. Clair	YES	NO	NO	NO

\*\*Safe Kids covered county.

### CPSTs by Location in 2014

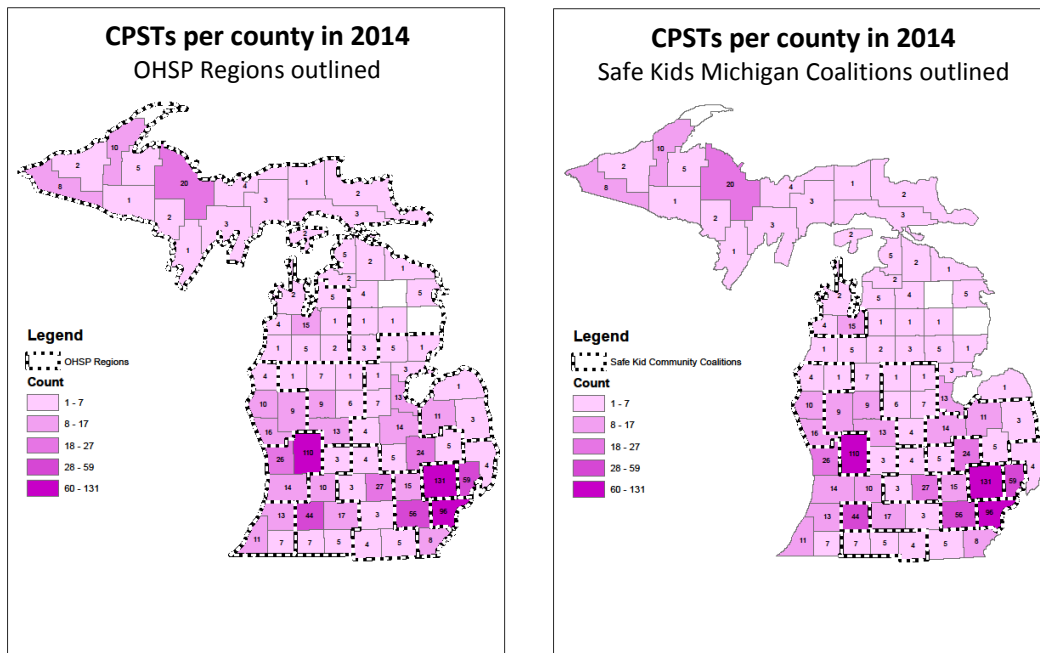
Table 8 summarizes the number of CPSTs per OHSP region, the number of CPSTs per county within each region, and the counties covered and not covered by Safe Kids Michigan Coalitions in 2014. There were 30 counties (36%) covered by Safe Kids Coalitions and 70% of CPSTs work in these counties. Among counties not covered by a Safe Kids coalition, 23 counties had 5 or more CPSTs, 27 counties had less than 5 CPSTs, and 3 counties had no CPSTs in 2014. Figure 11 maps the number of CPSTs by county within OHSP Traffic Safety Region and Safe Kids Michigan Coalition boundaries. Figure 12 shows the distribution of CPSTs throughout Michigan with the map of counties covered by a Safe Kids Michigan Coalition shown for reference (Figure 13). The distribution of CPST-Is closely aligned with the distribution of CPSTs who were trained to work with children with special needs (Figure 14). Most of the 15 CPSTs who speak Spanish were located in the western half of the Lower Peninsula (Figure 14).

**Table 8.** Number of CPSTs per region relative to Safe Kids Coalition coverage

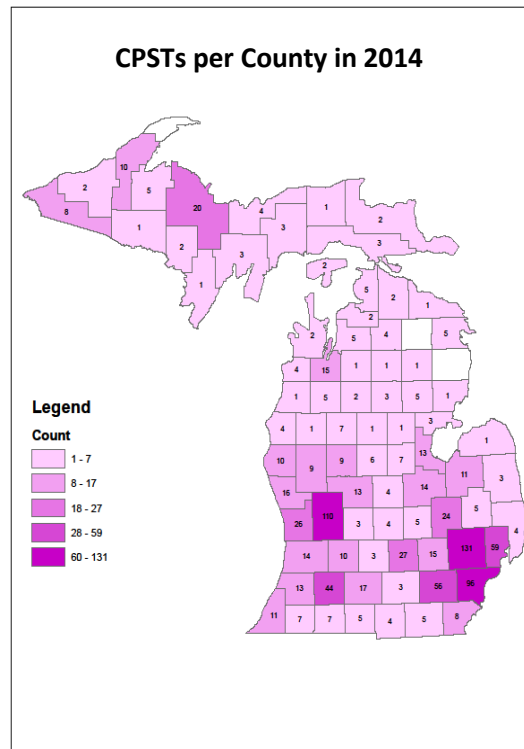
OHSP Traffic Safety Region	Safe Kids Coalition	Counties Covered by Safe Kids	Counties not covered by a Safe Kids Coalition		
			Counties with 5 or more CPSTs	Counties with less than 5 CPSTs	Counties with 0 CPSTs
(CPSTs in Region in 2014)	Coalition Name  (CPSTs in Safe Kid Coalition-covered counties, % of CPSTs in Region)	County name (Number of CPSTs in 2014)	County name (Number of CPSTs in 2014)	County name (Number of CPSTs in 2014)	County name
<b>Statewide (979*)</b>	<b>(687, 70%)</b>	<b>30 counties</b>	<b>23 counties</b>	<b>27 counties</b>	<b>3 counties</b>
1 Upper Peninsula (65)	No Safe Kids Coalition	None	Gogebic (8) Houghton (10) Baraga (5) Marquette (20)	Alger (4) Chippewa (2) Delta (3) Dickinson (2) Iron (1) Luce (1) Mackinac (3) Menominee (1) Ontonagon (2) Schoolcraft (3)	Keweenaw
2 Traverse Bay Area (34)	North Shore (22, 59%)	Grand Traverse (15) Leelanau (2) Benzie (3)	Antrim (5) Wexford (5)	Kalkaska (1) Manistee (1) Missaukee (2)	
3 Northern Lower (25)	No Safe Kids Coalition	None	Emmet (5) Alpena (6)	Charlevoix (2) Cheboygan (2) Crawford (1) Oscoda (1) Otsego (4) Presque Isle (1) Roscommon (3)	Alcona Montmorency
4 Lakeshore (39)	West Michigan (30, 77%)	Muskegon (16) Oceana (10) Mason (4)	Newaygo (9)		
5 Chippewa Valley (37)	West Michigan (1, 3%)	Lake (1)	Osceola (7) Montcalm (13) Mecosta (9)		
	MidMichigan (7, 23%)	Clare (1) Isabella (6)			
6 Saginaw Valley (82)	MidMichigan (12, 15%)	Midland (7) Gladwin (1) Gratiot (4)	Ogemaw (5) Bay (13)	Arenac (3) Iosco (1) Shiawassee (5)	
	Greater Flint (24, 29%)	Genesee (24)			
	Greater Thumb Area & Saginaw (16, 23%)	Lapeer (5) Saginaw (14)			
7 Thumb Area (15)	Greater Thumb Area & Saginaw (14, 93%)	Sanilac (3) Tuscola (11)		Huron (1)	
8 West Michigan (150)	Greater Grand Rapids (110, 73%)	Kent (110)	Ottawa (26) Allegan (14)		
9 Southwest (31)	No Safe Kids Coalition	None	Berrien (11) Van Buren (13) Cass (7)		

OHSP Region	Safe Kids covered Counties		Counties not covered by a Safe Kids Coalition		
			Counties with 5 or more CPSTs	Counties with less than 5 CPSTs	Counties with 0 CPSTs
(CPSTs in Region <i>in 2014</i> )	Coalition Name  (CPSTs in Safe Kid Coalition-covered counties, % of CPSTs in Region)	County name (Number of CPSTs <i>in 2014</i> )	County name (Number of CPSTs <i>in 2014</i> )	County name (Number of CPSTs <i>in 2014</i> )	County name
10 South Central (86)	Kalamazoo (44, 51%)	Kalamazoo (44)			
	Branch-Hillsdale-St. Joseph (12, 14%)	Branch (5) St. Joseph (7)	Barry (10) Calhoun (17)	Ionia (3)	
11 Capital Area (46)	Branch-Hillsdale-St. Joseph (4, 9%)	Hillsdale (4)	Lenawee (5)	Jackson (3)	
	Capital Area (34, 74%)	Clinton (4) Eaton (3) Ingham (27)			
12 Huron Valley (79)	Huron Valley (71, 90%)	Livingston (15) Washtenaw (56)	Monroe (8)		
13 Wayne (96)	Metro Detroit (96, 100%)	Wayne (96)			
14 Oakland (131)	Oakland Co. (131, 100%)	Oakland (131)			
15 Macomb/St. Clair (63)	Macomb (59, 92%)	Macomb (59)		St. Clair (4)	

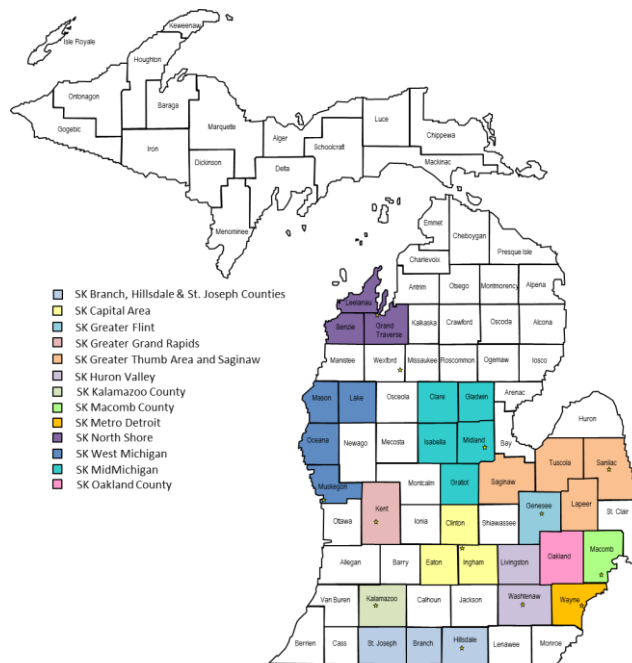
\*one CPST could not be assigned to a county due to incomplete address information.



**Figure 11.** CPSTs by county with OHSP Regions and Safe Kids Michigan Coalitions

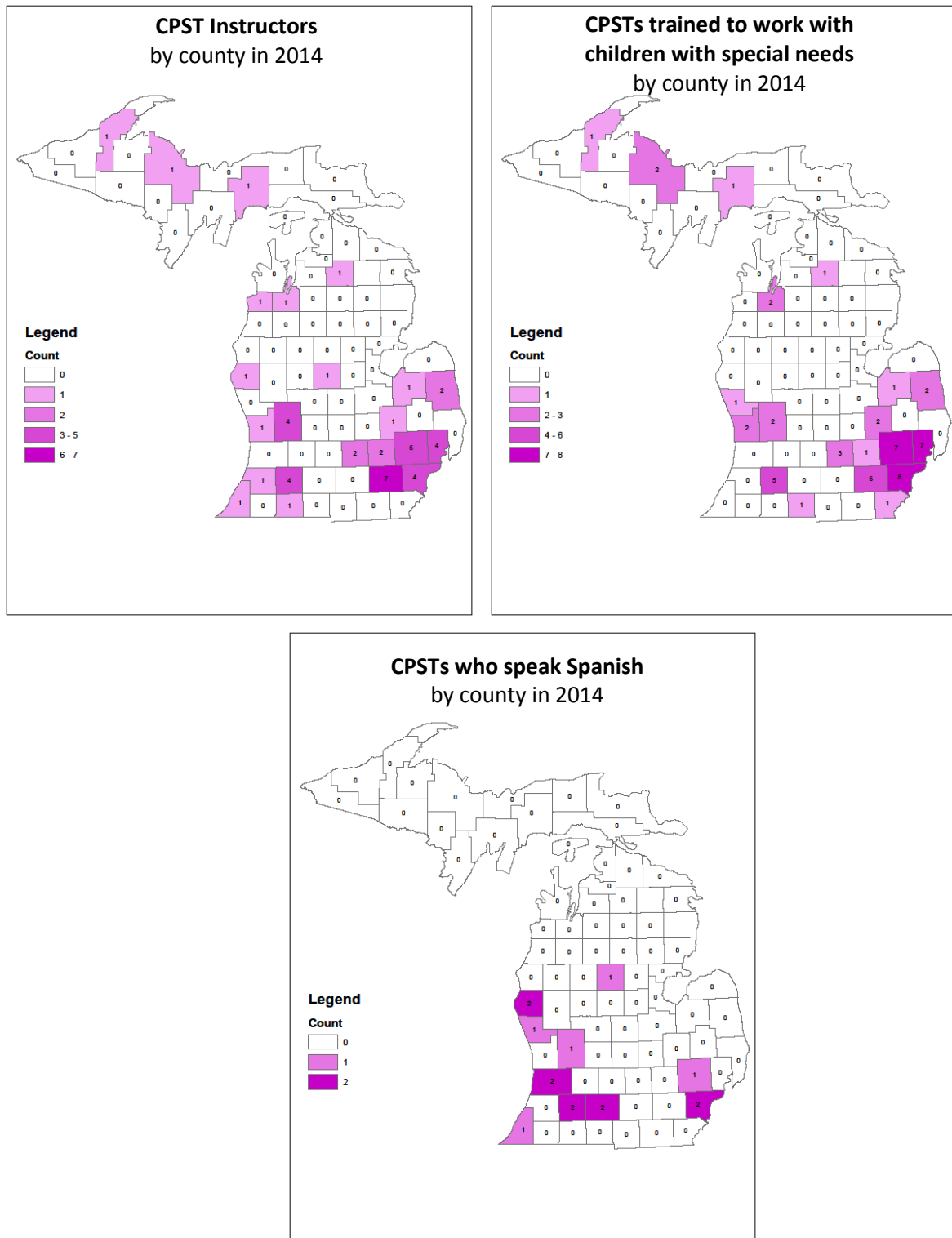


**Figure 12.** Distribution of CPSTs by county



Safe Kid Community Coalitions  
Michigan Department of Community Health  
Injury Prevention Section – 9/2014

**Figure 13.** Counties covered by Safe Kids Michigan Coalitions



**Figure 14.** CPSTs with additional skills by county in 2014

## Chapter 5. Characteristics of Michigan Child Passenger Safety Technicians

### METHODS

To characterize the CPST workforce in Michigan, the team of 5 investigators, including two CPSTs and one CPST-I, designed the 42-item anonymous survey using both fixed-choice and free response options and a follow-on identifiable survey to obtain contact information. Questions for the anonymous survey were developed to gather information about the type and amount of child passenger safety work the CPST conducts, the counties where their services are delivered, factors that influenced their decision to become a CPST, maintain certification, and engage in car seat checks, prior exposure to and interest in specialized courses for CPSTs, and demographic characteristics. The University of Michigan Medical School Institutional Review Board designated the survey exempt status.

CPSTs were asked to indicate the roles they had taken on related to their child passenger safety work. Options included CPST-I and Technician Proxy (described above in Chapter 4) as well as Senior Checker and Event Coordinator. Senior Checker is role with the Safe Kids Buckle Up program. A Senior Checker is an individual who makes the final inspection of an installation of a child restraint system before the family leaves the inspection and is responsible for assuring that the necessary paperwork (for the Safe Kids Buckle Up program) is correctly completed. Senior Checkers always work with another CPST on site. The category of Event Coordinator is not officially defined, but was intended to capture information about CPSTs who take on a role of scheduling seat check events and inspection stations for their agency.

The brief follow-on survey asked if the CPST was interested in being entered into a drawing to have their CPST recertification fees covered by OHSP, as an incentive for participation, and coordinators were asked if they were willing to be contacted regarding details about the timing and locations of car seat checks they have coordinated. Appendix B contains a copy of the two surveys.

The surveys were entered in the Qualtrics survey platform (Qualtrics LLC, Provo, UT) and pilot tested with 12 CPSTs from Michigan and other states. Questions and response options were refined based on feedback from the pilot testing. A survey link was distributed via email on October 5, 2015 to the OHSP-provided email list of certified CPSTs in Michigan as of September 29, 2015. Reminder emails were sent 7 and 10 days after the initial email request for participation. The survey link was open for 2 weeks.

Survey data were extracted from Qualtrics into Excel (Microsoft Corp, Redmond, WA). After compiling survey results, data were reviewed for consistency. The study team determined that, in response to Question 3.6 “estimate the percent of each type of car seat you typically check”, some respondents indicated the number of child passenger restraints checked and not the percentage. Therefore, we calculated percentages, totaling 100%, based on the counts entered by the CPST. The study team categorized the responses to for free-text response questions related to education and job title and harmonized the categories where possible. When coding the languages spoken, we assumed that all respondents spoke English even if they did not indicate it among the languages they reported speaking.

CPSTs were asked to indicate the ZIP Codes of their work and home. CPSTs were also asked to indicate all of the counties where they had conducted seat checks in the past year. ZIP Codes for work and home were geocoded using ArcGIS Desktop 10.3.1 (ESRI, Inc., Redlands, CA) to determine the location of the CPSTs by county. For the analyses of CPST location, we used work ZIP Code when available. If no work ZIP Code was provided we used home ZIP Code. CPSTs who did not provide any ZIP Code were not



included in results related to county location. We calculated response rates by region and by county based on the denominator of CPSTs in the OHSP-provided list of certified CPSTs from July 2015.

We created a new composite variable describing the overall activity level of a CPST based on how often they performed seat checks and how many child restraint systems they reported checking during a typical month when they checked seats. We categorized CPST activity levels as low (<5 seats checked per year), medium (5-24 seats checked per year), or high (> 25 seats checked per year) based on the frequency and number seats as indicated in Table 9.

**Table 9.** CPST activity level categories

	How many seats checked in typical month you did checks?					
How often?	1-2	3-5	6-10	11-20	21-30	>30
< 2 per year	Low	Low	Medium	Medium	High	High
2 per year	Low	Medium	Medium	High	High	High
Quarterly	Medium	Medium	High	High	High	High
Monthly	Medium	High	High	High	High	High
Weekly	Medium	High	High	High	High	High
Daily	Medium	High	High	High	High	High

Analysis of the survey data included univariate analysis to calculate response frequencies. Additional analysis was performed to identify characteristics of CPSTs associated with different levels of seat check activity. We estimated the number of seats checked per CPST per year by multiplying the frequency that a CPST reported completing seat checks and the number of seats checked in a typical month when the CPST was completing seat checks.

## RESULTS

Of the 1,008 email addresses contained in the OHSP list of CPSTs, 35 were returned as undeliverable and 11 returned out of office messages indicating the CPST would not be returning during the 2-week period that the survey was open. The remaining 962 were considered potential respondents. Among the potential respondents, 496 (52%) began the survey. Of the CPSTs who began the survey, 427 (86%) answered the last question. CPST-Is had a higher response rate (84%) than CPSTs in general.

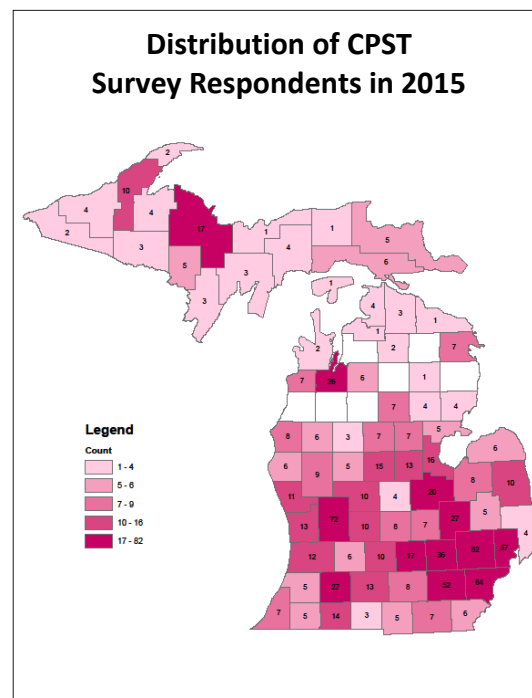
There were 439 CPSTs who provided a work and/or home ZIP Code; 20 provided a work ZIP Code only, 42 provided home ZIP Code only, and 377 provided both. Of the CPSTs who provided ZIP Codes, 90% provided a work ZIP Code. The geocoded ZIP Codes returned work and home counties that were the same for 238 of the 377 CPSTs who provided data for both locations. Of the 139 CPSTs who reported a different work and home ZIP Code, 129 (93%) mapped to adjacent counties. When considering all counties (work, home, and locations of seat checks) within a CPSTs response, 151 CPST indicated living, working, and checking seats all in one county and 166 reported two counties, 64 reported three counties, 22 reported four counties, 35 reported 5 to 13 counties. There were 57 CPSTs who did not provide any location information for the survey.

There was variation in the response rate by region (Table 10) with the highest response rate in the Traverse Bay Area (81%) and the lowest response rate in Wayne County (28%). The distribution of survey respondents by county is shown in Figure 15.

**Table 10.** Response rate by region

OHSP Region	Total CPSTs in 2015	Responding CPSTs	Response Rate
Statewide	971*	496**	51%
1 Upper Peninsula	72	31	43%
2 Traverse Bay Area	31	25	81%
3 Northern Lower	24	12	50%
4 Lakeshore	35	16	46%
5 Chippewa Valley	35	16	46%
6 Saginaw Valley	75	38	51%
7 Thumb Area	13	5	38%
8 West Michigan	143	61	43%
9 Southwest	26	12	46%
10 South Central	93	45	48%
11 Capital Area	52	20	38%
12 Huron Valley	75	40	53%
13 Wayne	90	25	28%
14 Oakland	137	65	47%
15 Macomb/St. Clair	70	21	30%

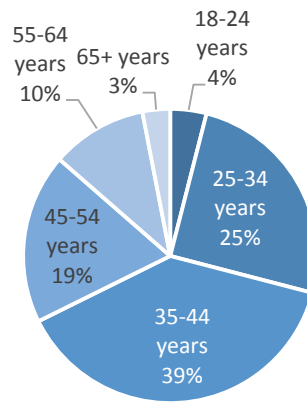
\*Two CPSTs could not be located to a county in OHSP records,  
\*\*64 survey respondents did not provide a home or work ZIP Code



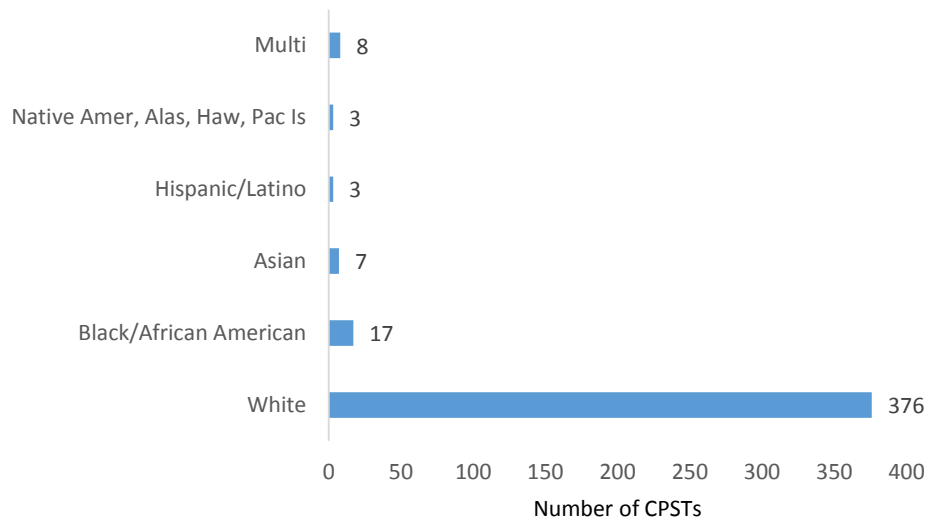
**Figure 15.** Distribution of CPST survey respondents

## Demographic Characteristics

Seventy-one percent of respondents self-identified as female. The most common age group was 35 to 44 years old (Figure 16). More than 90% of CPSTs self-reported they were non-Hispanic white race/ethnicity (Figure 17).

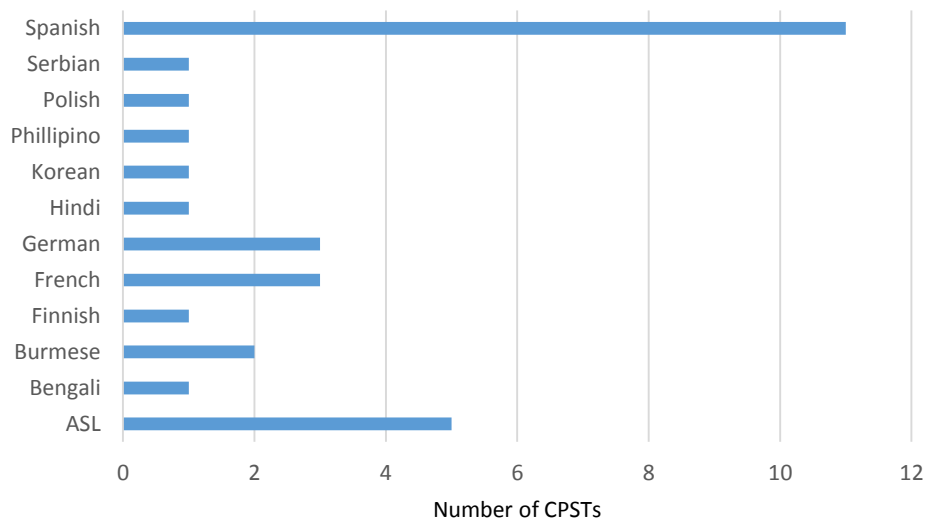


**Figure 16.** CPST-reported age group



**Figure 17.** CPST-reported race/ethnicity

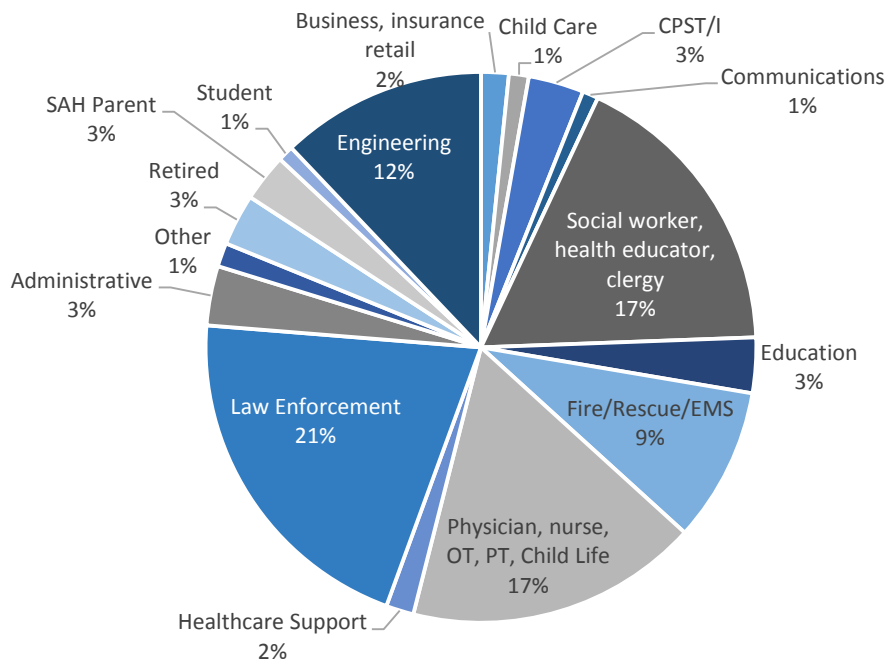
The number of CPSTs reporting comfort speaking a language or language(s) other than English to complete a car seat check is shown in Figure 18. The most common language other than English was Spanish. However, even as the most common language spoken other than English, less than 3% of respondents reported speaking Spanish.



**Figure 18.** CPST-reported languages other than English

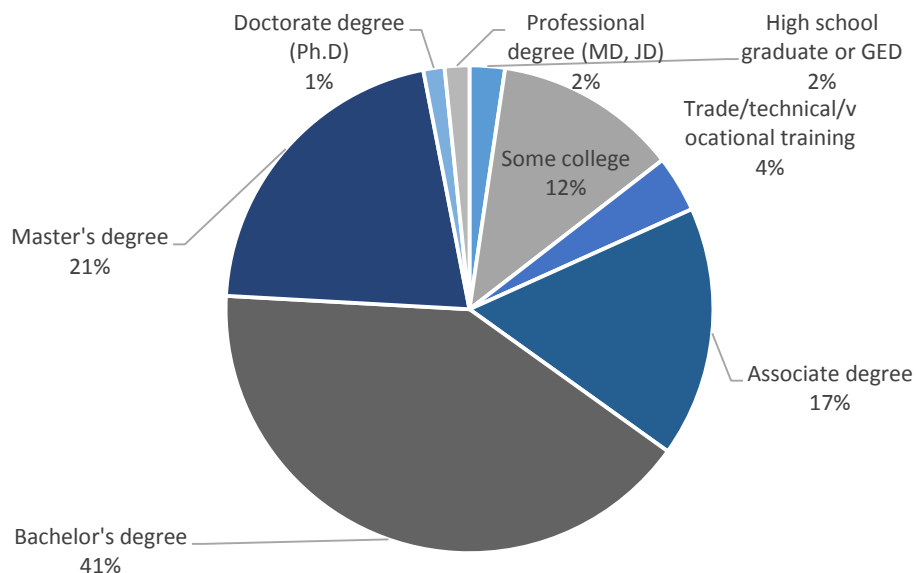
### Education and Occupation

Data regarding the distribution of respondents by their occupation, education level, and educational background are found in Figure 19 through Figure 21. The most common occupations were law enforcement, healthcare professional, social worker/health educator, and engineer (Figure 19).

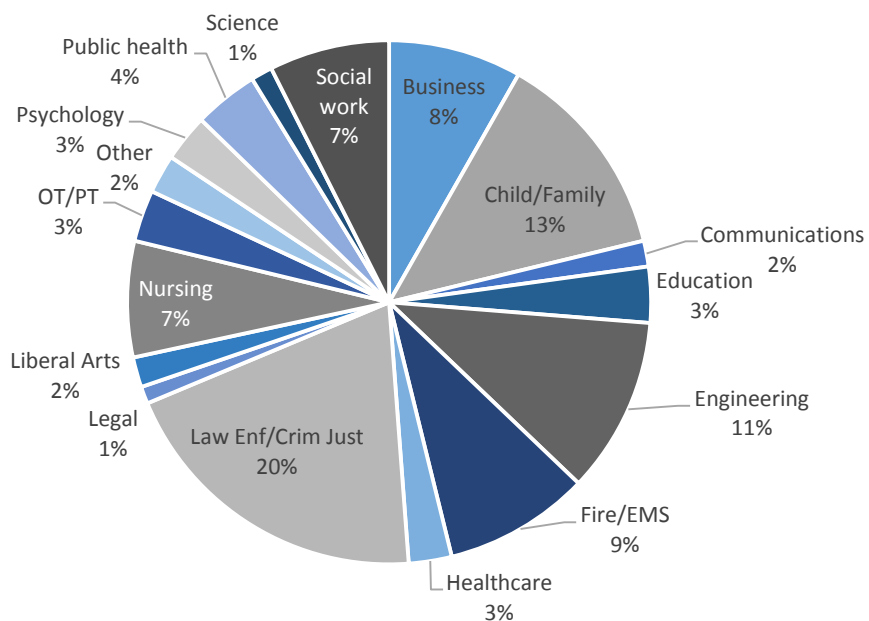


**Figure 19.** CPST-reported occupation

In general, respondents had received education after high school, most frequently earning a bachelor's degree, followed by a master's degree (Figure 20). Areas of study or professional training were diverse (Figure 21). The most common areas of study are law enforcement or criminal justice, child or family, and engineering.



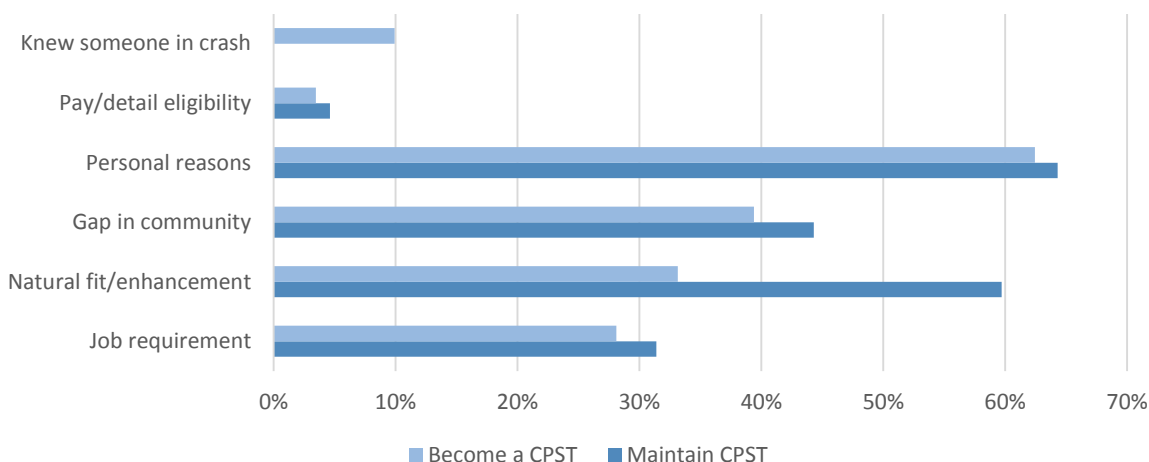
**Figure 20.** CPST-reported highest education level



**Figure 21.** CPST-reported area of study or professional training

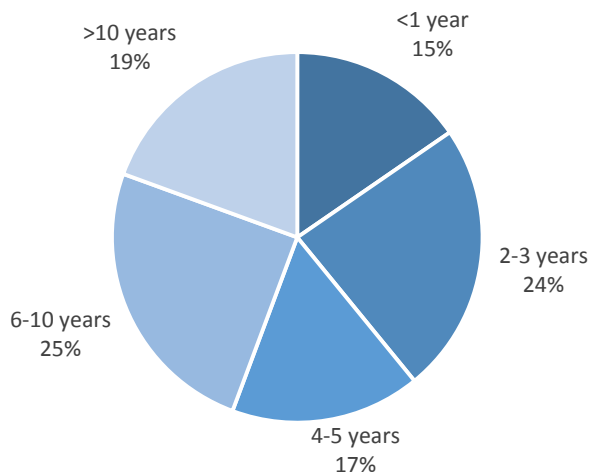
## Certification

Figure 22 lists the reasons why respondents became CPSTs (light blue bars), as well as why they maintained their certification (dark blue bars) among those who had completed a recertification cycle. The responses were similar except that almost twice as many people who maintained their certification reported that being a natural fit/enhancement to their job was a key reason for being a CPST compared to those who indicated this as a reason they first became a CPST.

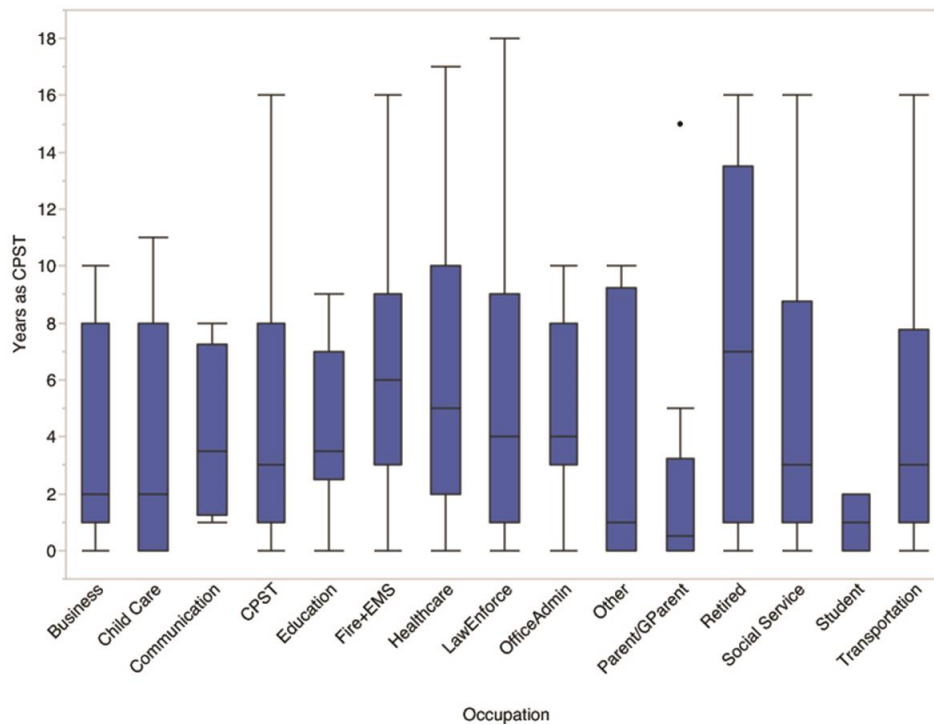


**Figure 22.** CPST-reported reasons to obtain and maintain certification

Categorical length of time respondents had been certified CPSTs is shown in Figure 23. Less than half had certified more than five years prior to survey. Ninety-three CPSTs indicated that they were still in their first certification cycle. Fifty CPSTs indicated that their certification had lapsed at least once and they had retaken their training. Figure 24 demonstrates the distribution of years as a CPST by occupation. The occupations with the highest mean duration as a CPST were Fire-EMS, Retired, and Healthcare. The occupations with the lowest mean duration as a CPST were Parent, Student, and Other.

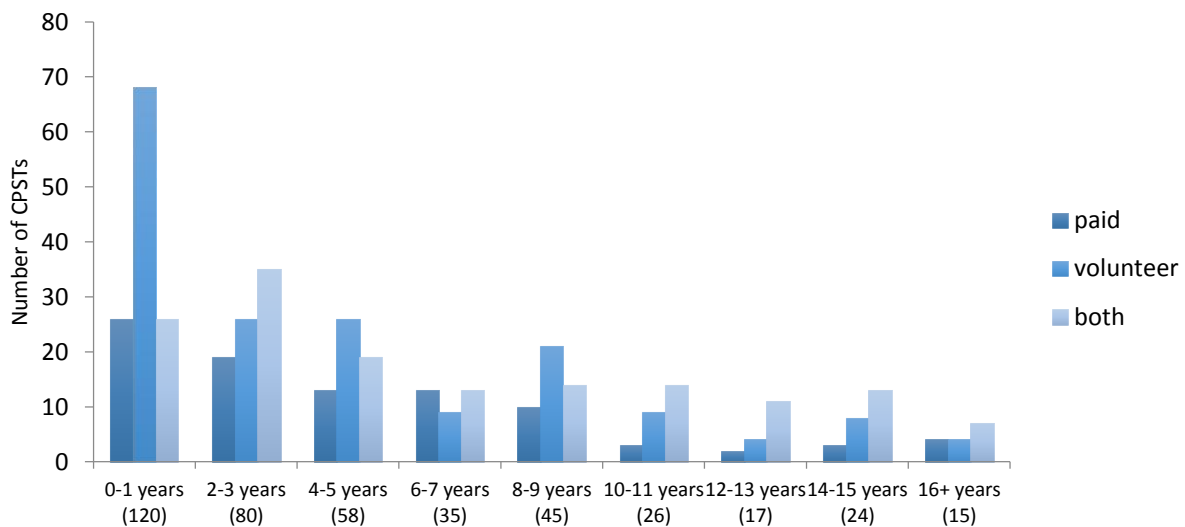


**Figure 23.** CPST-reported number of years since initial certification



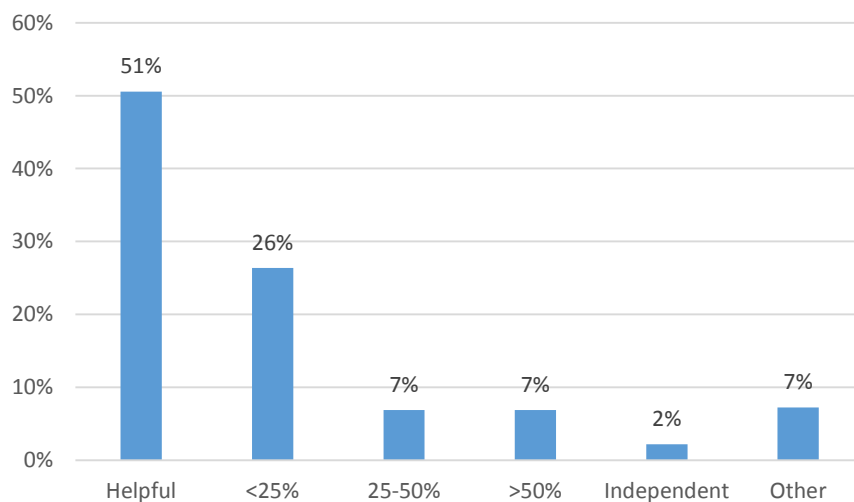
**Figure 24.** Years as CPST by occupation

Twenty-two percent of respondents indicated their work as a CPST was paid, 42% volunteer, and 36% serve as a CPST in both paid and volunteer capacities. Among CPSTs who only volunteer, 60% said it was helpful for their job. The distribution of CPST compensation model (i.e., paid, volunteer, both) by years since initial certification is shown in Figure 25. Among new technicians, over half were paid. For those working 10 or more years in the field, the largest proportion served as both paid and volunteer CPSTs.



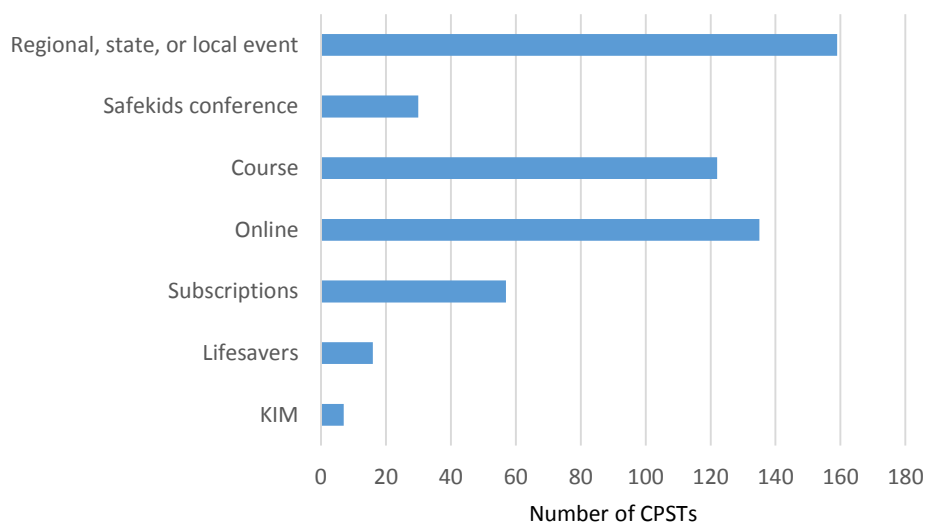
**Figure 25.** Compensation model by years since initial certification

Among CPSTs who reported this work was part of their job, roughly half reported being a CPST was helpful but did not make up a measurable amount of their job activities (Figure 26). For about one-fourth, being a CPST made up less than 25% of their job activities and for less than one-tenth being a CPST made up more than half of their job activities. A small percentage of CPSTs responding to the survey (2%) reported that they work as independent CPST contractors.



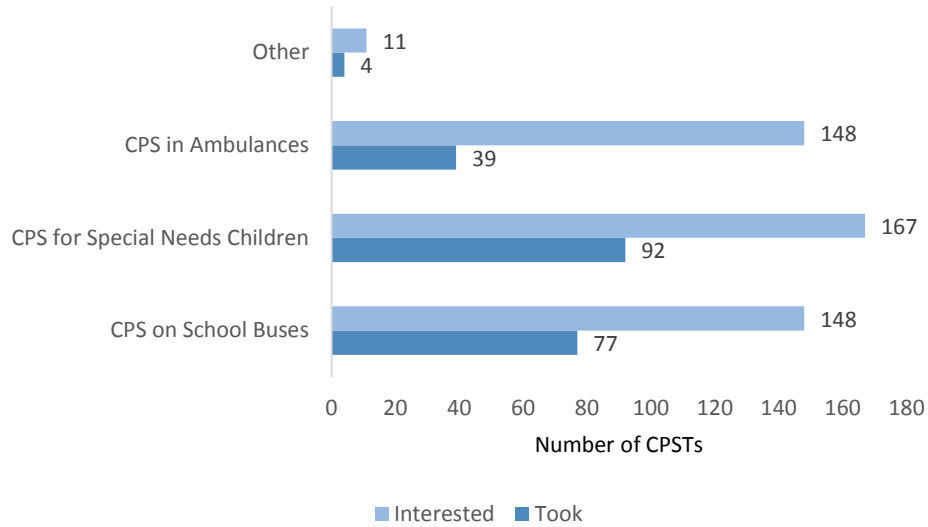
**Figure 26.** Percent of work-time spent on car seat checks

Most of the CPSTs earned their Continuing Education Units (CEUs) at local events, online, or through a course (Figure 27). Few earned CEUs by attending national conferences such as Lifesavers or Kidz in Motion (KIM). Figure 28 shows that many CPSTs have taken courses to obtain additional training regarding to special occupant populations (dark blue bars), and many more are interested in pursuing such training (light blue bars).



**Figure 27.** CPST-reported sources of continuing education units

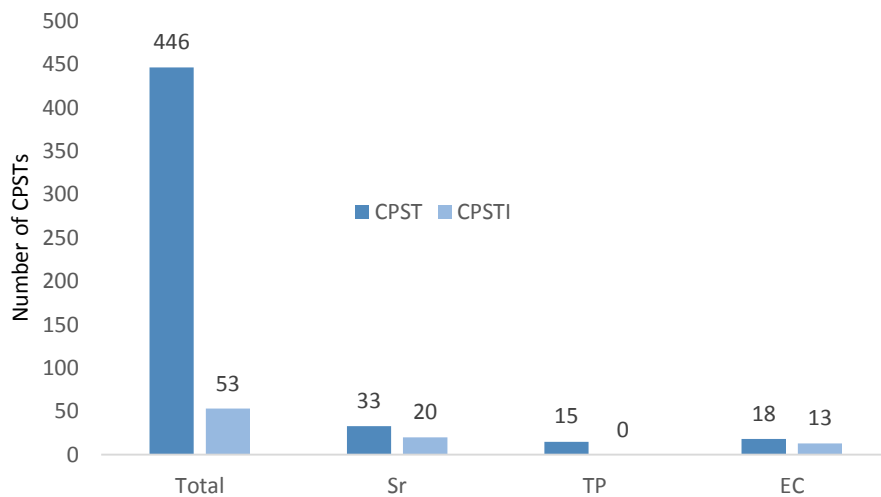




**Figure 28.** Courses CPSTs have taken or are interested in taking

## Roles

Respondents were queried as to the roles they undertake related to their work as a CPST. The distribution of their responses is shown in Figure 29. Just over 10% of respondents indicated they were CPST Instructors. The Senior Checker (Sr), Technician Proxy (TP), and Event Coordinator (EC) roles were selected by 11%, 3% and 6% of respondents respectively.

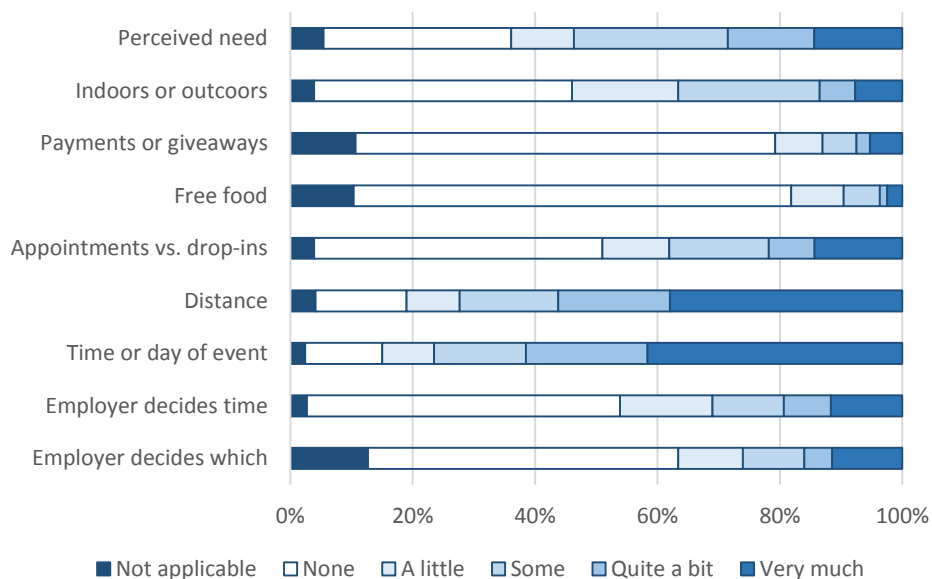


**Figure 29.** CPST roles in addition to seat checks

A little more than half of respondents (55%) indicated they work with a Safe Kids Michigan Coalition, 29% indicated they did not, and 16% said they did not know. When asked whether they distribute free seats provided by OHSP, 54% said they did, 33% said they did not, and 13% were not sure.

## Seat Check Motivation

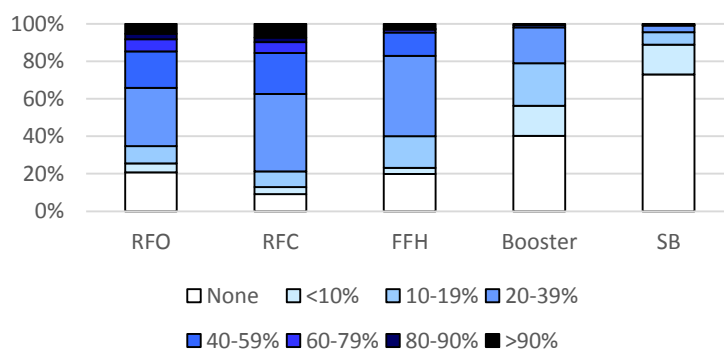
Figure 30 shows the degree to which specific factors influence a CPST's participation in seat checks. The two factors that CPSTs identified as having the greatest effect on their participation were time and distance to an event. Free food or giveaways were least often selected by CPSTs as having an effect on their participation in seat checks. The factors did not vary with activity level (results not shown).



**Figure 30.** Factors affecting participation in car seat check

## Types of child restraint systems checked

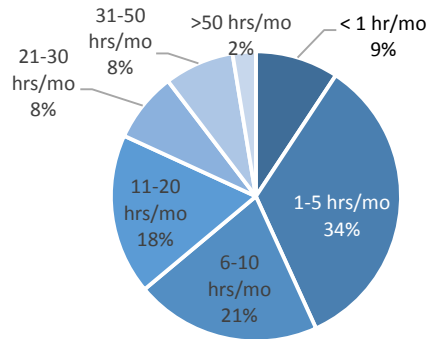
Figure 31 shows the proportion and distribution of the types of seats CPSTs check, per their estimation. More than 90% of CPSTs reported that they checked seats of more than one type. Of the 69 CPSTs who reported checking only one type of restraint system, 24 (35%) indicated checking only rear-facing only (RFO) restraints, 33 (48%) indicated checking only rear-facing convertible (RFC) restraints, and 12 (17%) indicated checking only forward-facing with 5-point harness (FFH) restraints. Over 70% of CPSTs responding to the survey reported they never check seat belts (SB), and 40% never check boosters.



**Figure 31.** CPST-reported types of child restraint systems checked

## Activity Level

CPSTs varied in terms of the number of hours spent each month doing seat checks (Figure 32). CPSTs also differed in terms of the frequency with which they check seats and the number of seats they check in a typical month that they were checking seats (Table 11).



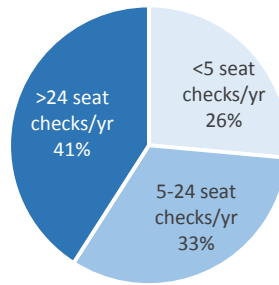
**Figure 32.** CPST-reported seat check hours in a typical month

We used CPST report of the number of seats checked in a typical month and the frequency with which they reported checking seats in the prior year to create activity levels. Study-determined activity levels are shown with shading in Table 11 [low activity (lightest blue), medium activity (mid-range blue), and high activity (darkest blue)].

**Table 11.** Distribution of Responses by CPSTs activity level

How often?	How many car seats did you check in typical month that you did checks?						No Response
	1-2	3-5	6-10	11-20	21-30	>30	
< 2 per year	52	14	6	2	0	1	4
2 per year	53	17	7	2	0	0	1
Quarterly	60	29	21	5	2	3	0
Monthly	26	54	25	13	4	0	1
Weekly	6	17	16	8	6	10	0
Daily	0	0	2	1	1	1	0

Figure 33 shows the distribution of the three levels of activity. About 40% of respondents were considered high-activity CPSTs (more than 24 seat checks per year), one-third medium-activity CPSTs (5 to 24 seat checks per year), and one-quarter low-activity CPSTs (<5 seat checks per year).



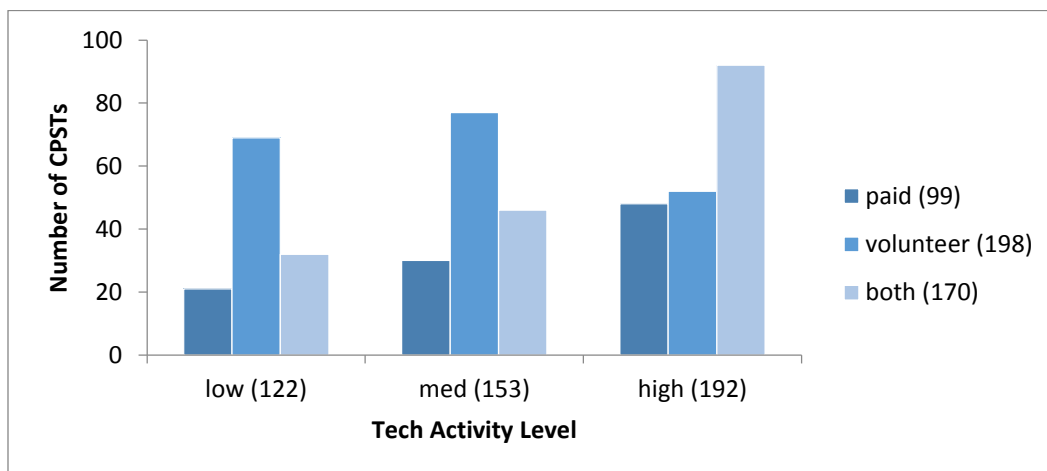
**Figure 33.** Distribution of CPSTs by activity level

Multiplying the number of seats checked in a typical month by the frequency of seat checks, we estimated the total number of seats checked per CPST per year to be 2 to 420. The estimated annual number of seats checked per CPST for each activity level is shown in Table 12.

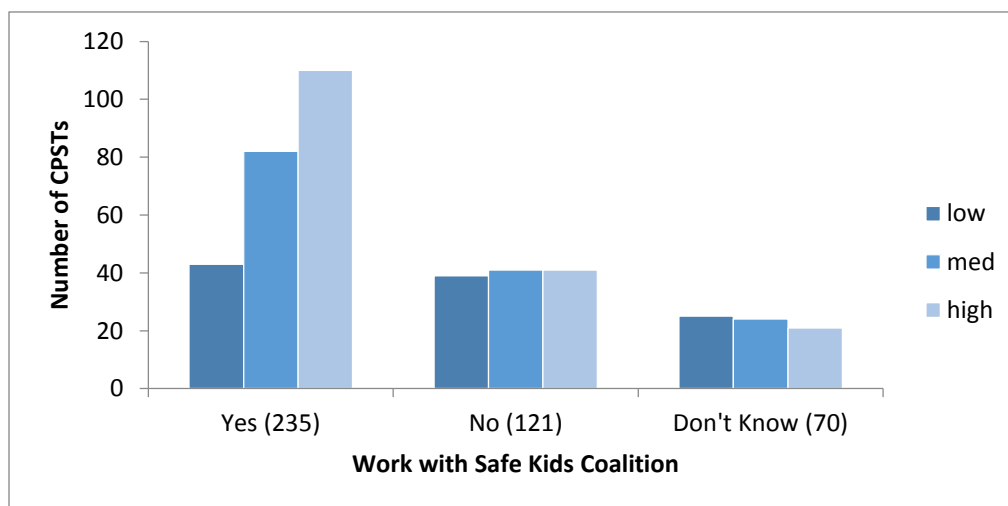
**Table 12.** Estimated number of car seats checked across CPST activity level

Activity Level	Number of CPSTs	<i>Estimated Number of Car Seats Checked in Year</i>	<i>Estimated Annual Seat Checks per CPST</i>
Overall	464	23,271	50
Low	119	292	2
Medium	153	1,726	11
High	192	21,253	111

Figure 34 shows that approximately half of high-activity CPSTs were both paid and volunteered, while about half of low- and medium-activity CPSTs only volunteered. Figure 35 shows that a similar number of low-activity CPSTs do and do not work with a Safe Kids Michigan Coalition, while a greater proportion of high- and medium-activity CPSTs do work with a Safe Kids Michigan Coalition.

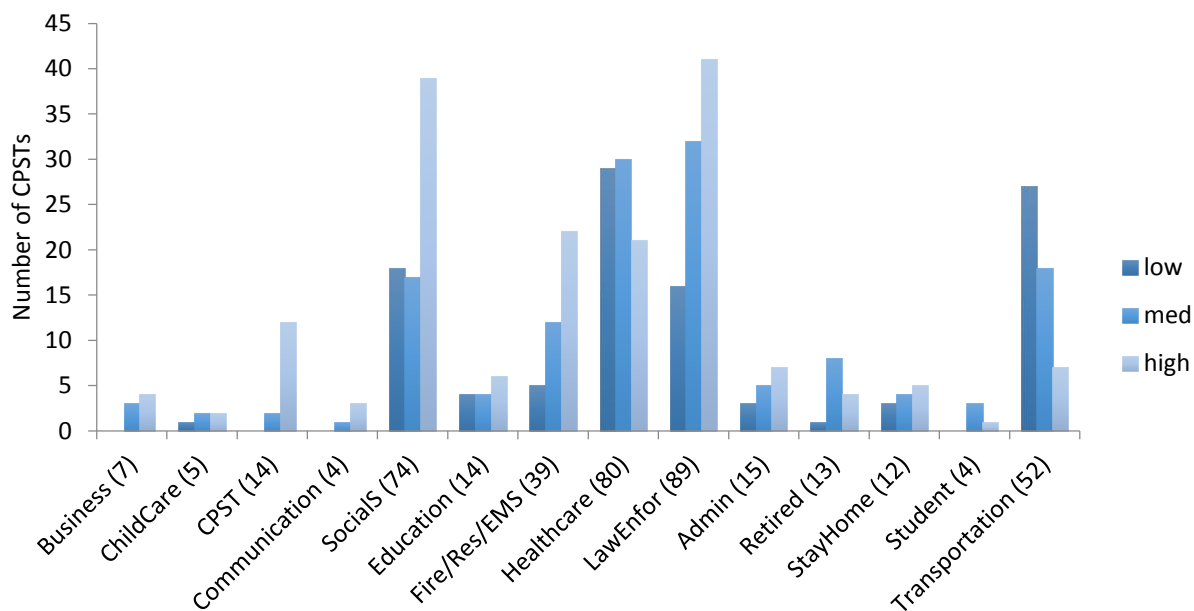


**Figure 34.** CPST activity level by compensation



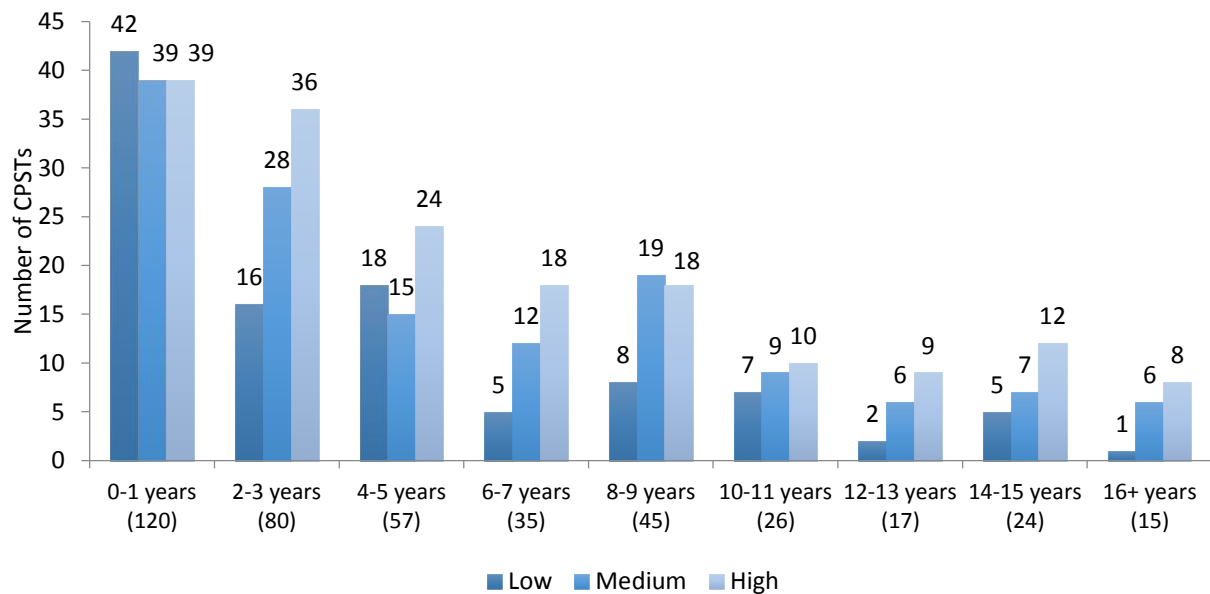
**Figure 35.** CPST activity level by work with a Safe Kids Coalition

The distribution of CPST activity level by occupation is shown in Figure 36. High-activity CPSTs most often reported working in law enforcement and social services, while medium-activity CPSTs most often reported working in law enforcement and health care. Low-activity CPSTs reported most often working in transportation and healthcare.



**Figure 36.** CPST activity level by occupation

Figure 37 shows the distribution of CPST activity level by length of time as a CPST. Among new CPSTs, in their first certification cycle, activity level was evenly divided. For longer duration CPSTs, high activity CPSTs made up about half in each group, with low activity CPSTs usually the lowest proportion. There was no relationship between density of CPSTs in a county and CPST activity level.



**Figure 37.** Activity level by years since initial certification

Survey response rates varied by county and in relation to CPST activity level (Table 13).

**Table 13.** Survey response rate by county and by activity level

	CPSTs in 2015	CPST-Is in 2015	Survey Respondents	Response Rate†	High Activity	Medium Activity	Low Activity	% Responses from High Activity CPST
Statewide	923	48	432	45%	174	151	107	40%
1 Upper Peninsula								
Alger	1	0	0	0	n/a	n/a	n/a	n/a
Baraga	5	0	2	40%	2	0	0	100%
Chippewa	4	0	1	25%	0	0	1	0
Delta	5	0	2	40%	1	0	1	50%
Dickinson	3	0	2	67%	1	1	0	50%
Gogebic	9	0	1	11%	1	0	0	100%
Houghton	10	1	5	50%	3	0	2	60%
Iron	1	0	2	100%+	2	0	0	100%
Keweenaw	0	0	1	100%+	0	1	0	0
Luce	1	0	0	0	n/a	n/a	n/a	n/a
Mackinac	4	0	3	75%	0	2	1	0
Marquette	18	2	7	39%	2	3	2	28%
Menominee	2	0	2	100%	0	1	1	0
Ontonagon	3	0	1	33%	0	1	0	0
Schoolcraft	2	1	2	100%	1	1	0	50%

2. Traverse Bay Area								
	CPSTs in 2015	CPST-Is in 2015	Survey Respondents	Response Rate†	High Activity	Medium Activity	Low Activity	% Responses from High Activity CPST
Antrim	3	0	0	0	n/a	n/a	n/a	n/a
Benzie**	3	0	5	100%+	1	3	1	29%
Grand Traverse**	15	1	4	27%	3	1	0	75%
Kalkaska	0	0	2	100%+	0	2	0	0
Leelanau**	1	0	12	100%+	7	1	4	58%
Manistee	3	0	0	0	n/a	n/a	n/a	n/a
Missaukee	2	0	1	50%	0	0	1	0
Wexford	3	0	1	33%	1	0	0	100%
3. Northern Lower								
Alcona	0	0	0	n/a	n/a	n/a	n/a	n/a
Alpena	4	1	4	100%	1	2	1	25%
Charlevoix	3	0	0	0	n/a	n/a	n/a	n/a
Cheboygan	2	0	0	0	n/a	n/a	n/a	n/a
Crawford	1	0	0	0	n/a	n/a	n/a	n/a
Emmet	5	0	3	60%	1	2	0	33%
Montmorency	0	0	0	n/a	n/a	n/a	n/a	n/a
Oscoda	0	0	0	n/a	n/a	n/a	n/a	n/a
Otsego	4	0	2	50%	0	0	2	0
Presque Isle	1	0	1	100%	0	1	0	0
Roscommon	3	0	2	67%	0	2	0	0
3. Lakeshore								
Mason**	5	1	2	40%	2	0	0	100%
Muskegon**	11	0	6	55%	5	1	0	83%
Newaygo	9	0	4	44%	1	3	0	25%
Oceana**	9	0	4	44%	1	3	0	25%
5. Chippewa Valley								
Clare**	1	0	1	100%	1	0	0	100%
Isabella**	6	1	5	83%	5	0	0	100%
Lake**	1	0	2	100%+	0	1	1	0
Mecosta	9	0	3	33%	0	2	1	0
Montcalm	11	0	5	45%	2	2	1	40%
Osceola	6	0	0	0	n/a	n/a	n/a	n/a
6. Saginaw Valley								
Arenac	2	0	1	50%	1	0	0	100%
Bay	13	0	8	61%	3	1	4	37%
Genesee**	18	1	13	72%	4	6	3	31%
Gladwin**	0	0	0	n/a	n/a	n/a	n/a	n/a
Gratiot**	4	0	2	50%	2	0	0	100%
Iosco	1	0	2	100%+	2	0	0	100%
Lapeer**	3	0	1	33%	0	0	1	0
Midland**	9	0	3	33%	2	1	0	67%
Ogemaw	4	0	1	25%	1	0	0	100%
Saginaw**	18	0	7	38%	1	3	3	14%
Shiawassee	2	0	0	0	n/a	n/a	n/a	n/a
7. Thumb Area								
Huron	1	0	0	0	n/a	n/a	n/a	n/a
Sanilac**	1	2	3	100%+	2	1	0	67%
Tuscola**	8	1	2	25%	0	1	1	0
8. West Michigan								
Allegan	14	1	11	78%	1	6	4	9%
Kent**	94	4	43	46%	19	16	8	44%
Ottawa	29	1	7	24%	7	0	0	100%

9. Southwest								
	CPSTs in 2015	CPST-Is in 2015	Survey Respondents	Response Rate†	High Activity	Medium Activity	Low Activity	% Responses from High Activity CPST
Berrien	7	1	5	72%	2	3	0	40%
Cass	10	0	4	10%	1	3	0	25%
Van Buren	7	1	3	43%	0	1	2	0
10. South Central								
Barry	10	0	4	40%	1	3	0	25%
Branch**	5	0	3	60%	2	0	1	67%
Calhoun	19	0	11	58%	6	3	2	54%
Ionia	3	0	4	100%+	2	2	0	50%
Kalamazoo**	47	2	17	36%	3	6	8	18%
St. Joseph**	6	1	6	100%	2	3	1	33%
11. Capital Area								
Clinton**	6	0	2	33%	0	1	1	0
Eaton**	5	0	4	80%	1	2	1	25%
Hillsdale**	4	0	1	25%	1	0	0	100%
Ingham**	25	2	9	36%	4	2	3	44%
Jackson	5	0	1	20%	0	1	0	0
Lenawee	5	0	3	60%	2	0	1	67%
12. Huron Valley								
Livingston**	16	2	9	56%	3	3	3	33%
Monroe	7	0	3	43%	1	2	0	33%
Washtenaw**	43	7	28	65%	13	11	4	46%
13. Wayne County								
Wayne**	86	4	25	29%	11	9	5	44%
14. Oakland County								
Oakland**	131	6	65	50%	20	20	25	31%
15. Macomb and St. Clair Counties								
Macomb**	61	4	18	29%	7	5	6	38%
St. Clair	5	0	3	60%	3	0	0	100%

†Response rate could be higher than 100%, presumably due to some CPSTs providing a different address in the survey than was provided when they reported information to the lists of current CPSTs provided to the study team by OHSP.

\*\*Safe Kids Michigan Coalition covered county.



## **Chapter 6. Events and Inspection Stations**

### **METHODS**

Results regarding the organization, location, and frequency of car seat checks gathered in the CPST survey are included in this chapter. At the conclusion of the main anonymous survey, CPSTs were directed to a second survey where they were asked to provide contact information if they were a coordinator who was willing to be interviewed by our research team, for the purposes of gathering information about the specific location(s) of past car seat events/stations.

Of the 476 respondents to the main survey, 428 started the second survey focused on obtaining identifying information and 420 completed it. Among respondents to the second survey, 83 (20%) indicated they were willing to be contacted regarding specific car seat events/stations and 81 provided their contact information. The resulting list of 81 CPSTs was reviewed by the research team and it was determined that three Safe Kids Coalition coordinators were missing and therefore added to the contact list. A member of the research team (AT) contacted each of the 84 CPSTs via email in December 2015. The email communication included a request to provide detailed information about the location, date, and type of car seat checks conducted by their agency or coalition in 2014. CPSTs were offered the option to respond via email, fax, or phone interview.

We received information from CPSTs in the form of annual reports, flyers, and via telephone interviews. Telephone interviews were structured to obtain information about the name and address of the agency or coalition, type of car seat checks (one-time event, scheduled inspection (or fitting) station, or mobile service provided to families at a convenient location), service coordination (drop-in or appointment), date(s), frequency of service for recurrent car seat checks, and the type of location. Type of location was categorized into: 1) Healthcare facility/hospital; 2) Fire Department or Police Department; 3) Community/public health; 4) Car seat retailer; 5) Insurance agency; 6) Faith-based organization; 7) Childcare center/school; 8) Car dealership; 9) Mall; 10) Park; 11) Other.

Addresses for car seat check locations were geocoded using ArcGIS Desktop 10.3.1 (ESRI, Inc., Redlands, CA) and overlapping addresses were combined to provide one unique address for each seat check location. Among the seat check locations where a frequency was provided, we summed the number of occasions that seat checks occurred and mapped the frequencies by county.

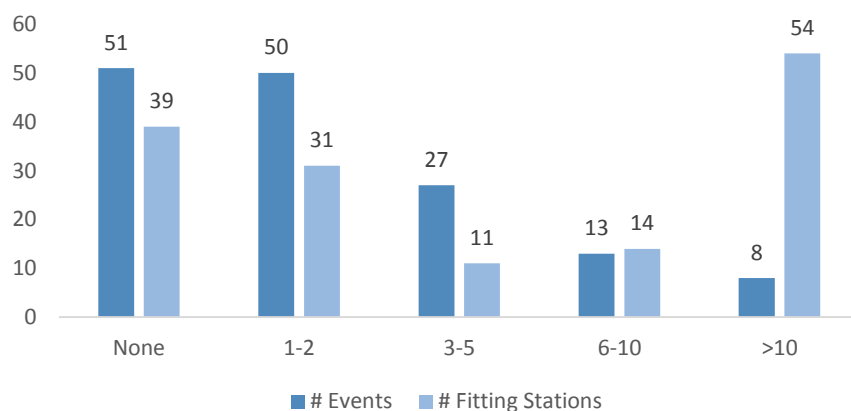
In addition to the 84 coordinators contacted, the research team identified the 36 hospitals that are Michigan Designated Trauma Centers.<sup>17</sup> For each hospital on the list, the hospital website was reviewed to determine if the hospital provides car seat services to the community. A research assistant (HO) then contacted each hospital, via their main number on the website, to inquire about car seat services as though she were a mother looking for information for her own use of car seat services. Agreement between hospital website and phone contact was assessed with the kappa statistic.

### **RESULTS**

#### **Seat Check Coordination**

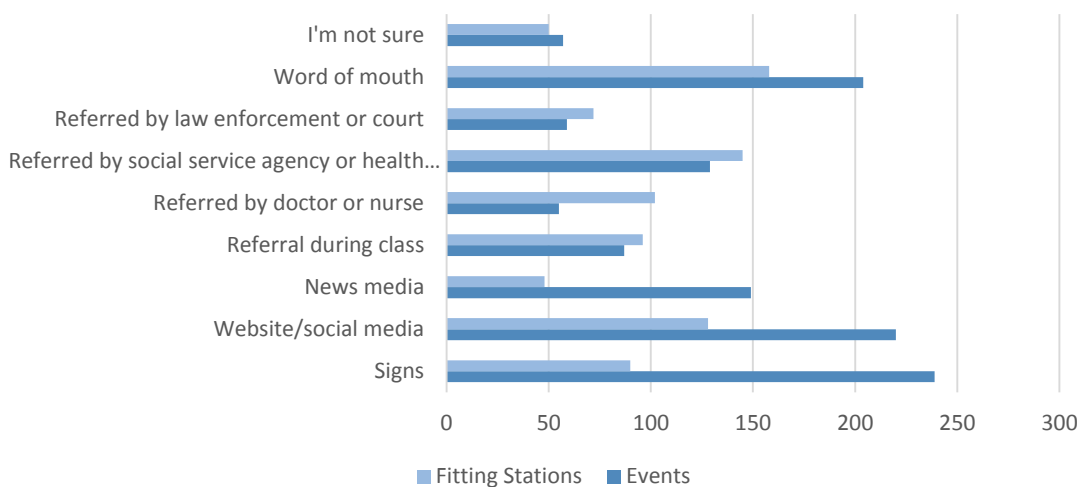
In response to the anonymous survey, 150 CPSTs indicated that they coordinated a seat check event or inspection (or fitting) station in the past 12 months. The distribution of their responses, by number of events or inspection stations, is shown in Figure 38. About one-third of respondents only coordinated

inspection stations but not events, while about one-third only coordinated events but not inspection stations. Less than one-quarter of CPSTs who organized checks said they ever asked participants to evaluate their car seat check experience. It is worth noting that while 150 CPSTs selected “yes” when asked if they ever coordinated events, only 31 CPSTs indicated they were an “Event Coordinator” when asked about roles. We suspect that some CPSTs did not select Event Coordinator for their role, considering it an official title like Senior Checker. Five CPSTs indicated they were Event Coordinators but they did not organize any events or inspection stations in the prior year.



**Figure 38.** CPST coordinated events and inspection stations

We asked how the CPSTs thought caregivers learned about the seat check services they provided. Results are shown in Figure 39. CPSTs presumed families at seat check events more often learned about them from signs, websites/social media, and news media, while CPSTs presumed families at inspection stations more often learned about them from law enforcement, social service agencies, or healthcare professionals.

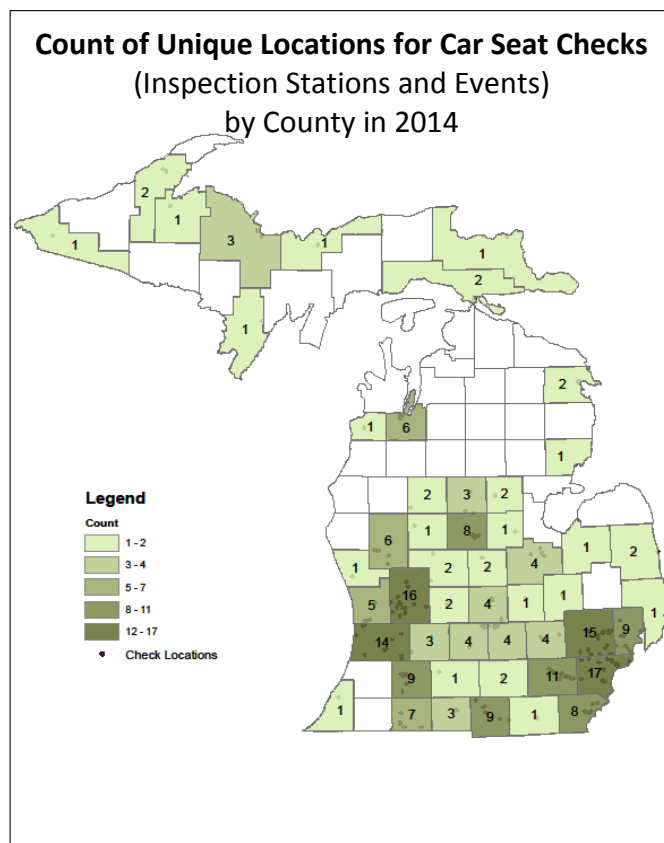


**Figure 39.** CPST-reported source of caregivers for events and inspection stations

## Car Seat Check Locations in Michigan in 2014

Of the 84 CPSTs contacted for detailed information about the seat checks they coordinated in 2014, 12 (14%) were considered ineligible after learning they did not coordinate car seat checks in 2014. As data were collected, we identified 16 (19%) CPSTs who represented an agency or coalition from whom we had already received information. Ten of the remaining 56 CPSTs did not respond to multiple contact attempts. We collected data about the location, date, and type of car seat checks from 46 CPSTs (82% of 56 eligible respondents).

According to data collected from this subset of CPSTs, car seat checks were held in at least 51 Michigan counties in 2014. Eleven of these counties held seat checks but the CPST could not provide the frequency of the checks. Figure 40 maps the unique seat check locations by county. Figure 41 provides information about the frequency of seat check occurrences (inspection stations and events) within each county, at locations for which this information was available.



**Figure 40.** Locations of car seat check inspection stations and events in 2014



## Child Passenger Safety Services in Trauma Facilities

Based on review of hospital websites, it appeared that 16 of 37 trauma facilities offered car seat checks or provided information for a community program for child passenger safety. We were able to reach an operator or nurse at 32 of the 37 hospitals to inquire about car seat services. Based on telephone calls, 14 hospitals offered car seat checks as indicated in Table 14. There was 81% agreement between website and telephone information (kappa 0.63).

**Table 14.** Child passenger safety services in Michigan Trauma Facilities

Hospital	Location	Trauma Center Designation <sup>24</sup>		Child Passenger Safety Services	
		Adult	Pediatric	by website	by phone
Beaumont Botsford Hospital	Farmington Hills	Level II		No	Not reached
Beaumont Hospital: Grosse Pointe	Grosse Pointe	Level III		Yes	Yes
Beaumont Hospital: Royal Oak	Royal Oak	Level I	Level II	Yes	Yes
Beaumont Hospital: Wayne	Wayne	Level III		No	No
Beaumont Oakwood: Dearborn	Dearborn	Level II		No	Not reached
Beaumont Oakwood: Southshore	Trenton	Level II		No	Not reached
Borgess Medical Center	Kalamazoo	Level II		No	No
Bronson Methodist Hospital	Kalamazoo	Level I		Yes	Yes
Children's Hospital of Michigan	Detroit		Level I	Yes	Yes
Covenant Hospital	Saginaw	Level II	Level II	No	Not reached
Detroit Receiving Hospital	Detroit	Level I		Yes	No
Genesys Regional Medical Center	Grand Blanc	Level II		No	No
Helen DeVos Children's Hospital	Grand Rapids		Level I	Yes	Yes
Henry Ford Hospital	Detroit	Level I		No	No
Henry Ford Macomb Hospital	Clinton Twp	Level II		No	No
Henry Ford Wyandotte Hospital	Wyandotte	Level III		No	No
Hurley Medical Center	Flint	Level I	Level II	Yes	Yes
McLaren Flint	Flint	Level III		No	No
McLaren Lapeer Region	Lapeer	Level II		No	No
McLaren Macomb Hospital	Mt. Clemens	Level II		No	No
McLaren Oakland	Pontiac	Level II		No	No
Mercy Health Muskegon – Hackley	Muskegon	Level II		Yes	Yes
Mercy Health Saint Mary's	Grand Rapids	Level II		No	No
MidMichigan Medical Center	Midland	Level II		Yes	No
Munson Medical Center	Traverse City	Level II		Yes	Yes
Providence Hospital	Southfield	Level II		No	No
Sinai-Grace Hospital	Detroit	Level II		No	Not reached
Sparrow Hospital	Lansing	Level I		Yes	Yes
Spectrum Health Butterworth	Grand Rapids	Level I		Yes	Yes
St. John Hospital & Medical Center	Detroit	Level II	Level II	No	No
St. Joseph Mercy Hospital	Ann Arbor	Level II		No	Yes
St. Joseph Mercy Oakland	Pontiac	Level II		No	Yes
St. Mary's of Michigan	Saginaw	Level II		Yes	No
UMHS/C.S. Mott Children's Hospital	Ann Arbor	Level I	Level I	Yes	Yes
UP Health System – Marquette	Marquette	Level II		Yes	No
UP Health System - Portage	Hancock	Level III		Yes	Yes

## Chapter 7. Impact of Seat Checks and Restraint Systems Distributed to Families

### METHODS

We received files from Safe Kids Michigan<sup>1</sup> containing data extracted from two versions of the Child Passenger Safety Checklist Forms (8,184 forms from 2010 and early 2011; 16,987 forms from 2011 and later). In total, we received data for 25,171 forms (each form represented one row of data). These forms contain information about individual seats checked at either *inspection stations* or *events*. Each form has information for up to two seat checks for the same vehicle (one entered on the front and one on the back of the form). We created a dataset that contained two rows of data per form (one row of data per side) resulting in 50,342 rows of data. To exclude data that was extracted from a blank second page efficiently, we excluded cases that had “NULL” or “MISSING” values for 60 or more of the 93 variables on the page. This resulted in a dataset containing 32,838 rows of data. We then excluded 427 rows of data that contained duplicate information, leaving 32,411 Safe Kids Michigan seat checks for analysis.

Participant address information, as hand entered onto forms from Safe Kids Michigan and scanned into Excel, was geocoded using Google Maps Geocoding API (Google Inc., Mountain View, CA). This allowed for the mapping of the geocoded participant home addresses using ArcGIS Desktop 10.3.1 (ESRI, Inc., Redlands, CA) to determine the locations of families who utilized Safe Kids Michigan car seat checks between January 2010 and June 2015. On the first pass, 4,986 (20%) addresses from the original data file (representing 25,171 forms) could not be geocoded. These addresses were hand-reviewed and corrected by the research assistants (HO, MB). Typographical errors and errors in the scanner reading of handwritten information were common causes for addresses not being geocoded on the first pass.

Data used in analyses of the impact of car seat checks include restraint type on arrival and departure, installation method on arrival and departure, location of restraint on arrival and departure, restraint history, prior crash, labels missing, expired seat, recalled seat, installation direction, whether a seat was provided to the family, and whether the check was an event or station. Data were reconciled between the two different versions of the form (2010/2011 and 2011+) as coding of some variables had changed.

We considered a seat change to have occurred if a child had a different restraint type between arrival and departure and a problem or error to have been identified if the CPST indicated that seat was involved in a prior crash, had missing labels, was expired, recalled, or the history of the seat was unknown. We also examined change in direction and change in seat installation method between arrival and departure. We calculated counts and percentages for variables by year to describe the impact of seat checks on program participants. We also determined how many seats were provided by a coalition and the proportion of seats that were checked at a station or event.

Weight and height data were not considered valid for analyses, as CPSTs did not use consistent units of measure (e.g., pounds, kilograms). In addition, these handwritten responses were not accurately or reliably scanned. Similar concerns prevented the use of scanned data related to coalition and technician.

We examined the relationship between the total number of Safe Kids Michigan Coalition seat checks (2010-2014) by participant address and the number of certified CPSTs in Michigan in July 2015

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<sup>1</sup> When interpreting the data presented in this chapter, it should be noted that during the study period there were no Safe Kids Coalitions in the Upper Peninsula of Michigan.

graphically and using the Pearson Correlation test. July 2015 was selected to represent the number of CPSTs in Michigan each year for this analysis.

OHSP provided data related to seats distributed to sites in the Lower Peninsula through their office from as early as April 2011 to as recently as November 2014. Data provided by OHSP included:

- 1) *reporting forms* (a CPST-generated report summarizing the types of child restraint systems provided to families through the OHSP community car seat distribution program);
- 2) *half sheets* (an OHSP-generated tally of OHSP-funded child restraint systems with documentation of distribution submitted by CPSTs to OHSP); and
- 3) *child passenger safety checklist forms* (submitted by CPSTs to document their distribution of OHSP-funded child restraint systems to families).

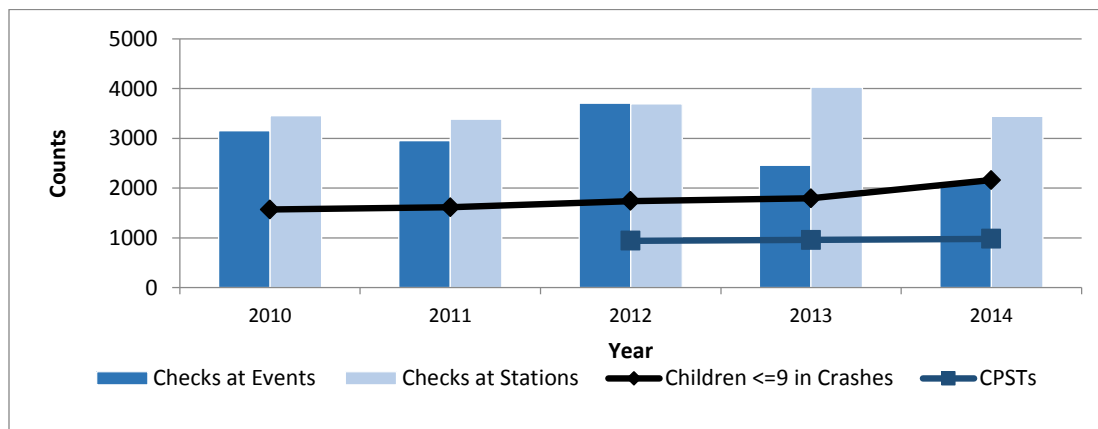
The *reporting forms* were used to determine the number of OHSP seats distributed throughout the Lower Peninsula and the location for each agency was determined through searches on Google Maps (Google, Inc., Mountain View, CA). Data for seats purchased through a grant from OHSP to the Upper Peninsula from 2010 through 2014 were obtained from the project director of Kids Always Ride Safe (KARS). Summary files provided to the research team contained the number of seats and the date of distribution to agencies in the Upper Peninsula. The location of each agency was determined through searches on Google Maps (Google, Inc., Mountain View, CA).

## RESULTS

Data from 32,411 seat checks conducted by the Safe Kids Coalitions in Michigan's Lower Peninsula were available for analysis. Data from 2010 to 2014 represented full years of data; only 13 seat checks were from 2015. Roughly one-third of forms (35%) included two seats checked in a single vehicle.

### Safe Kids Seat Checks, 2010-2014

The total number of seats checked per year through Safe Kids Michigan Coalitions is shown in Figure 42, ranging from a low of 5,569 in 2014 to a high of 7,396 in 2012. The majority of seats were checked at an inspection station (light blue bars) as opposed to an event (dark blue bars). The total number of seats checked at an event was lower in 2013 and 2014 compared with prior years. Inspection station or event was not indicated on 680 (2%) forms. There was an increase in the number of crashes involving a child  $\leq 9$  who was killed, injured, improperly restrained or in the front from 2010 to 2014 (black line, diamond marker) and the number of CPSTs remained stable (blue line, square marker).



**Figure 42.** Number of Safe Kids Michigan seat checks, crashes, and CPSTs by year

## Restraint Type and Installation Method

Table 15 shows child restraint system types and the methods of installation in use *on arrival* to a car seat check and Table 16 shows child passenger restraint types and the methods of installation in use *on departure* from a car seat check. The most common restraint types on arrival were rear-facing car seats (47%) followed by forward-facing car seats (22%). On departure, the proportion of rear-facing and forward-facing car seats increased to 57% and 25% respectively. Roughly 70% of child restraint systems had a method of installation indicated on arrival and more than 95% had a method of installation indicated on departure. Seat belt only and lower anchor only installation methods were most common on arrival and departure.

**Table 15.** Safe Kids Michigan seat check checklist; characteristics – on arrival

	2010 N (%)	2011 N (%)	2012 N (%)	2013 N (%)	2014 N (%)	2015* N (%)	Overall N (%)
<b>Restraint in use</b>	<b>6609</b>	<b>6338</b>	<b>7396</b>	<b>6486</b>	<b>5569</b>	<b>13</b>	<b>32411</b>
Rear-facing	2799 (42.35)	2969 (46.85)	3341 (45.17)	3190 (49.18)	2902 (52.11)	10 (76.92)	15211 (46.93)
Forward-facing	1585 (23.98)	1367 (21.57)	1639 (22.16)	1367 (21.08)	1108 (19.90)	1 (7.69)	7067 (21.80)
Booster	857 (12.97)	718 (11.33)	783 (10.59)	687 (10.59)	580 (10.41)	0 (0.00)	3625 (11.18)
Seat belt	483 (7.31)	370 (5.84)	381 (5.15)	281 (4.33)	240 (4.31)	0 (0.00)	1755 (5.41)
No restraint	885 (13.39)	914 (14.42)	1252 (16.93)	961 (14.82)	739 (13.27)	2 (15.38)	4753 (14.66)
<b>Installation method</b>	<b>4781 (72.34)</b>	<b>4418 (69.71)</b>	<b>5045 (68.21)</b>	<b>4625 (71.31)</b>	<b>3969 (71.27)</b>	<b>5 (38.46)</b>	<b>22843 (70.48)</b>
Seat belt only	3416 (71.45)	2838 (64.24)	3234 (64.10)	2799 (60.52)	2235 (56.31)	2 (40.00)	14524 (63.58)
Lower anchors (LA) only	839 (17.55)	977 (22.11)	1076 (21.33)	1110 (24.00)	1036 (26.10)	2 (40.00)	5040 (22.06)
Seat belt + tether	93 (1.95)	99 (2.24)	131 (2.60)	125 (2.70)	136 (3.43)	1 (20.00)	585 (2.56)
LA + tether	209 (4.37)	243 (5.50)	288 (5.71)	302 (6.53)	301 (7.58)	0 (0.00)	1343 (5.88)
Seat belt + LA	163 (3.41)	175 (3.96)	216 (4.28)	197 (4.26)	174 (4.38)	0 (0.00)	925 (4.05)
Tether only	23 (0.48)	44 (1.00)	48 (0.95)	40 (0.86)	49 (1.23)	0 (0.00)	204 (0.89)
All 3 in use	38 (0.79)	42 (0.95)	52 (1.03)	52 (1.12)	38 (0.96)	0 (0.00)	222 (0.97)

\*partial year of data from 2015



**Table 16.** Safe Kids Michigan seat check checklist; characteristics – on departure

	<b>2010 N (%)</b>	<b>2011 N (%)</b>	<b>2012 N (%)</b>	<b>2013 N (%)</b>	<b>2014 N (%)</b>	<b>2015* N (%)</b>	<b>Overall N (%)</b>
<b>Restraint in use</b>	<b>6609</b>	<b>6338</b>	<b>7396</b>	<b>6486</b>	<b>5569</b>	<b>13</b>	<b>32411</b>
Rear-facing	3340 (50.54)	3644 (57.49)	4091 (55.31)	3872 (59.70)	3417 (61.35)	11 (84.62)	18375 (56.70)
Forward-facing	1648 (24.94)	1425 (22.48)	1882 (25.45)	1516 (23.37)	1260 (22.63)	1 (7.69)	7732 (23.86)
Booster	1375 (20.80)	1031 (16.27)	1122 (15.17)	889 (13.71)	740 (13.29)	0 (0.00)	5157 (15.91)
Seat belt	166 (2.51)	157 (2.48)	169 (2.29)	149 (2.30)	101 (1.81)	0 (0.00)	742 (2.29)
No restraint	80 (1.21)	81 (1.28)	132 (1.78)	60 (0.93)	51 (0.92)	1 (7.69)	405 (1.25)
<b>Installation method</b>	<b>6397 (96.79)</b>	<b>6100 (96.24)</b>	<b>7097 (95.96)</b>	<b>6316 (97.33)</b>	<b>5403 (97.02)</b>	<b>12 (92.31)</b>	<b>31325 (96.65)</b>
Seat belt only	4492 (70.22)	3767 (61.75)	4237 (59.70)	3526 (55.83)	2929 (54.21)	11 (91.67)	18962 (60.53)
Lower anchors (LA) only	1149 (17.96)	1416 (23.21)	1579 (22.25)	1598 (25.30)	1480 (27.39)	0 (0.00)	7222 (23.06)
Seat belt + tether	247 (3.86)	305 (5.00)	503 (7.09)	542 (8.58)	489 (9.05)	0 (0.00)	2086 (6.66)
LA + tether	413 (6.46)	541 (8.87)	676 (9.53)	571 (9.04)	410 (7.59)	1 (8.33)	2612 (8.34)
Seat belt + LA	30 (0.47)	23 (0.38)	26 (0.37)	23 (0.36)	30 (0.56)	0 (0.00)	132 (0.42)
Tether only	21 (0.33)	31 (0.51)	65 (0.92)	45 (0.71)	55 (1.02)	0 (0.00)	217 (0.69)
All 3 in use	45 (0.70)	17 (0.28)	11 (0.15)	11 (0.17)	10 (0.19)	0 (0.00)	94 (0.30)

\*partial year of data from 2015

### Child Restraint System Problems Identified

The CPST-identified problems discovered during car seat checks are shown in Table 16. History unknown and incorrect direction were most common. Expired seats and those missing labels were identified in less than 10% of seat checks. About twice as many seats were involved in a crash than were recalled.

**Table 17.** Problems identified in Safe Kids Michigan seat checks

<b>Problems Identified</b>	<b>2010 N (%)</b>	<b>2011 N (%)</b>	<b>2012 N (%)</b>	<b>2013 N (%)</b>	<b>2014 N (%)</b>	<b>2015* N (%)</b>	<b>Overall N (%)</b>
History unknown	2302 (34.83)	2030 (32.03)	2558 (34.59)	1919 (29.59)	1591 (28.57)	3 (23.08)	10403 (32.10)
Expired	609 (9.21)	538 (8.49)	721 (9.75)	578 (8.91)	468 (8.40)	1 (7.69)	2915 (8.99)
Labels missing	621 (9.40)	527 (8.31)	643 (8.69)	500 (7.71)	435 (7.81)	0 (0.00)	2726 (8.41)
Involved in a crash	147 (2.22)	241 (3.80)	547 (7.40)	281 (4.33)	221 (3.97)	0 (0.00)	1437 (4.43)
Recalled	179 (2.71)	158 (2.49)	146 (1.97)	87 (1.34)	332 (5.96)	1 (7.69)	903 (2.79)
Direction incorrect	2034 (30.78)	2041 (32.20)	2474 (33.45)	2124 (32.75)	1809 (32.48)	4 (30.77)	10486 (32.35)

## Changes Resulting from Seat Checks

Comparing information recorded on arrival to on departure, 43% of forms indicated a change in restraint type, 50% a change in installation method and 36% a change in the seating location for the child (Table 18). Coalitions provided a seat to families for about half of the checks. Seats were often provided to families who had a seat on arrival.

**Table 18.** Overall impact of Safe Kids Michigan seat checks

	2010 N (%)	2011 N (%)	2012 N (%)	2013 N (%)	2014 N (%)	2015* N (%)	Overall N (%)
<b>Change on Departure</b>							
Seat type	2893 (43.77)	2697 (42.55)	3387 (45.80)	2723 (41.98)	2233 (40.10)	2 (15.38)	13935 (42.99)
Installation method	2844 (43.03)	3072 (48.47)	3852 (52.08)	3363 (51.85)	2906 (52.18)	10 (76.92)	16047 (49.51)
Location in vehicle	2214 (33.50)	2266 (35.75)	2811 (38.01)	2438 (37.59)	2106 (37.82)	5 (38.46)	11840 (36.53)
<b>Coalition provided seat</b>	3284 (49.69)	2833 (44.70)	3521 (47.61)	2949 (45.47)	2376 (42.66)	2 (15.38)	14965 (46.17)
Seat provided to a family with a seat on arrival	2320 (70.65)	1970 (69.54)	2457 (69.78)	2133 (72.33)	1762 (74.16)	2 (100.00)	10644 (71.13)

\*Partial year of data from 2015

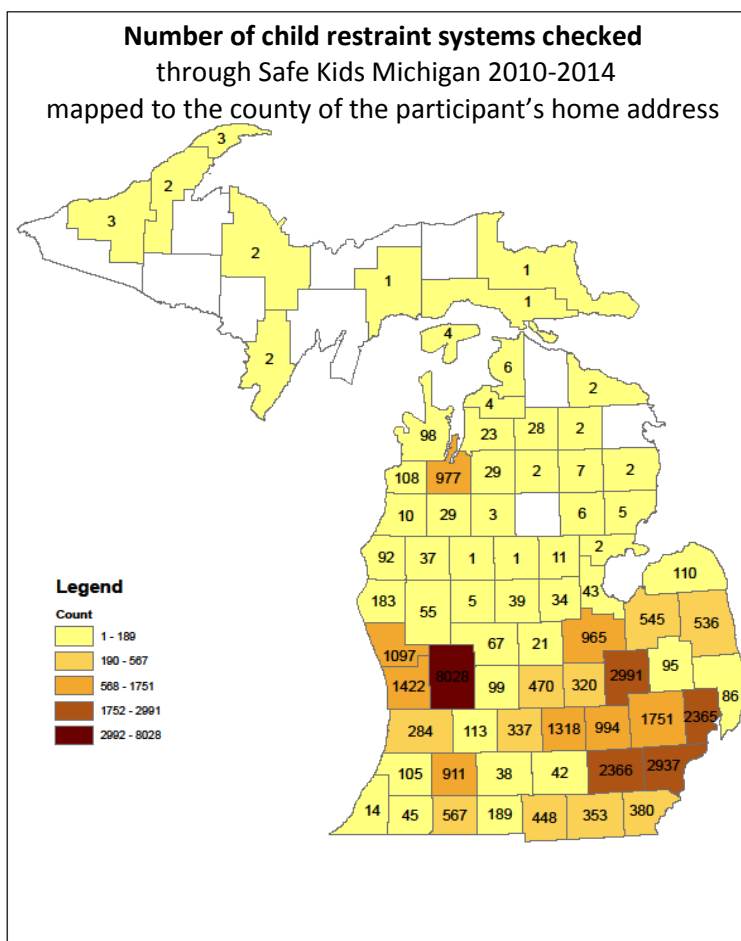
Table 19 compares the type of restraint in use on arrival to the type of restraint in use on departure for the sample. No change is shown in the cells without shading (along the diagonal). Changes in seat type were least common when a rear-facing car seat was the restraint in use on arrival and most common when a seat belt or no restraint were in use on arrival. In Table 19, a change to a more protective seat is highlighted in green, a change to the next level restraint (likely because the child outgrew the restraint in which they arrived at the seat check) is highlighted in yellow, and a change to no restraint in orange. We hypothesize that seat checks that resulted in “no restraint” on departure were coding errors as a guiding principle of car seat checks is to have children leave more safely restrained than when they arrived.

**Table 19.** Changes in restraint type as a result of Safe Kids Michigan seat checks

On ARRIVAL	On Departure				
	<i>Rear-facing (18378)</i>	<i>Forward-facing (7733)</i>	<i>Booster (5157)</i>	<i>Seat belt (742)</i>	<i>No restraint (405)</i>
<b>Rear-facing (15214)</b>	14394 (94.61)	621 (4.08)	52 (0.34)	22 (0.14)	125 (0.82)
<b>Forward-facing (7068)</b>	855 (12.10)	5477 (77.49)	640 (9.05)	24 (0.34)	72 (1.02)
<b>Booster (3625)</b>	93 (2.57)	713 (19.67)	2719 (75.01)	60 (1.66)	40 (1.10)
<b>Seat belt (1755)</b>	71 (4.05)	283 (16.13)	875 (49.86)	497 (28.32)	29 (1.65)
<b>No restraint (4753)</b>	2965 (62.38)	639 (13.44)	871 (18.33)	139 (2.92)	139 (2.92)

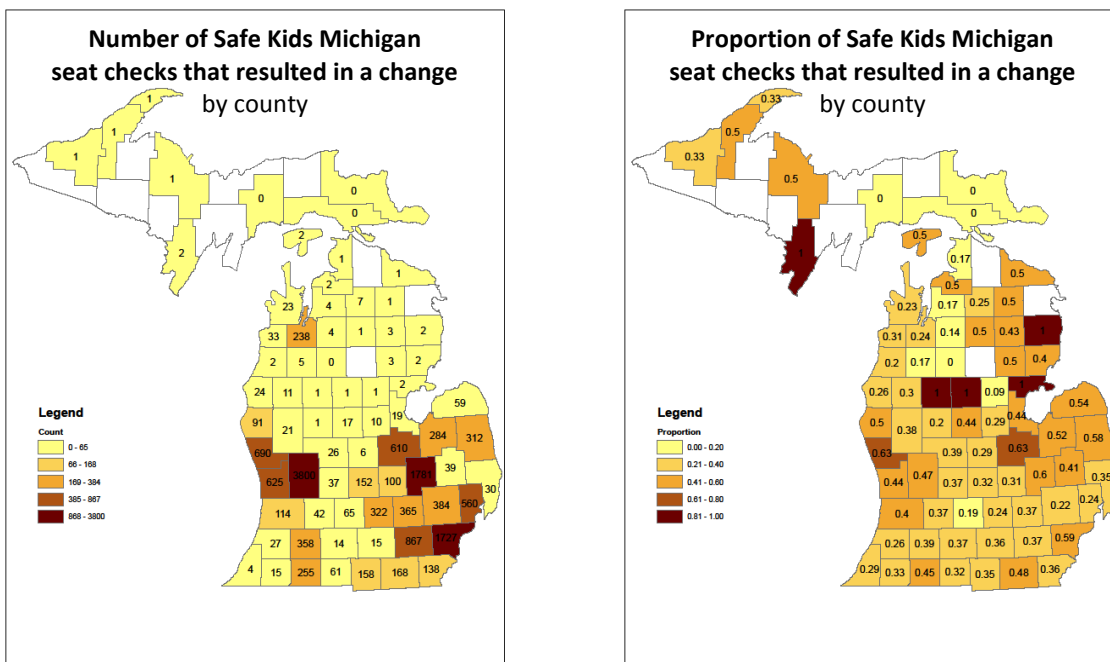
### Safe Kids Seat Checks by Participant's County of Residence

Figure 43 shows the total number of Safe Kids Michigan seat checks completed between 2010 and 2014 mapped to the county in which the participant resides. The number of seats checked through Safe Kids Michigan is an underrepresentation of the total number of seats checked in the state due to situations where a seat is checked by a CPST working outside of an affiliation with a Safe Kids Michigan Coalition. It is also important to recall that Safe Kids Michigan Coalitions cover 60 of the 83 counties in Michigan, with no coverage in the Upper Peninsula. Families living outside of a Safe Kids Coalition covered county may travel to across county lines to obtain services from a CPST affiliated with a Safe Kids Michigan Coalition. The county with the highest number of residents having seats checked was Kent (8,026 seat checks). There were between 2,300 and 3,000 seats checked for families from Genesee, Wayne, Washtenaw, and Macomb Counties. Families from the Upper Peninsula infrequently had seat checks in the Safe Kids Michigan dataset, which was expected given the lack of Safe Kids Coalitions in the Upper Peninsula.

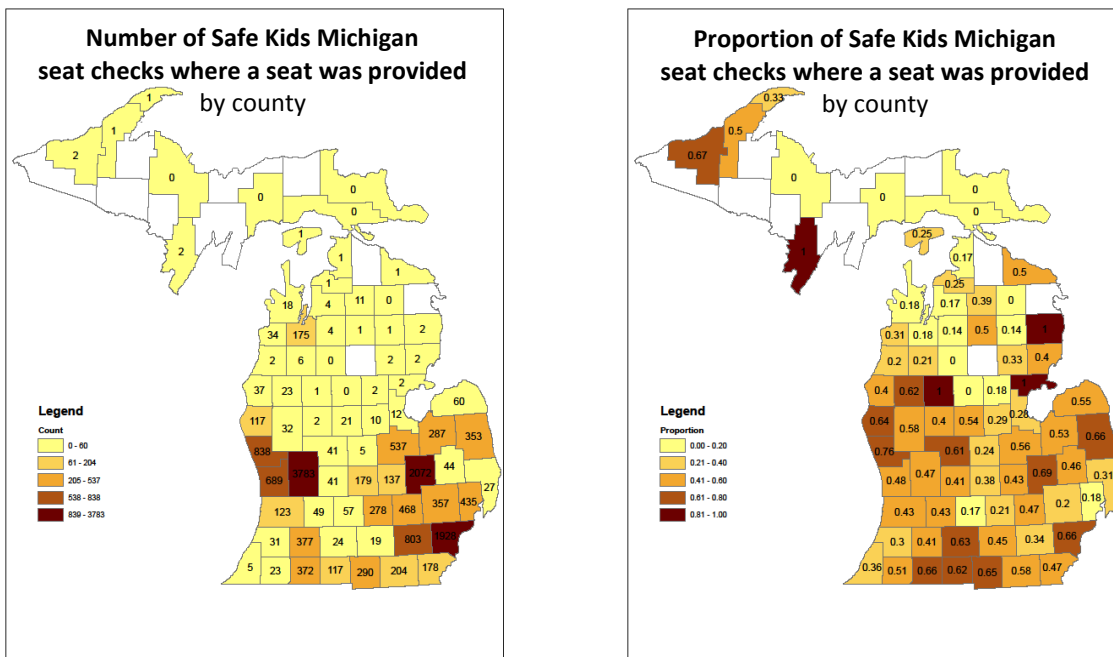


**Figure 43.** Total number of car seats checked for Safe Kids Michigan per county

Figure 44 presents the count and proportion of Safe Kids Michigan seat checks that resulted in a change by county of residence of the participants. Figure 45 presents the count and proportion of Safe Kids Michigan coalition provision of a seat by county of resident of the participants.

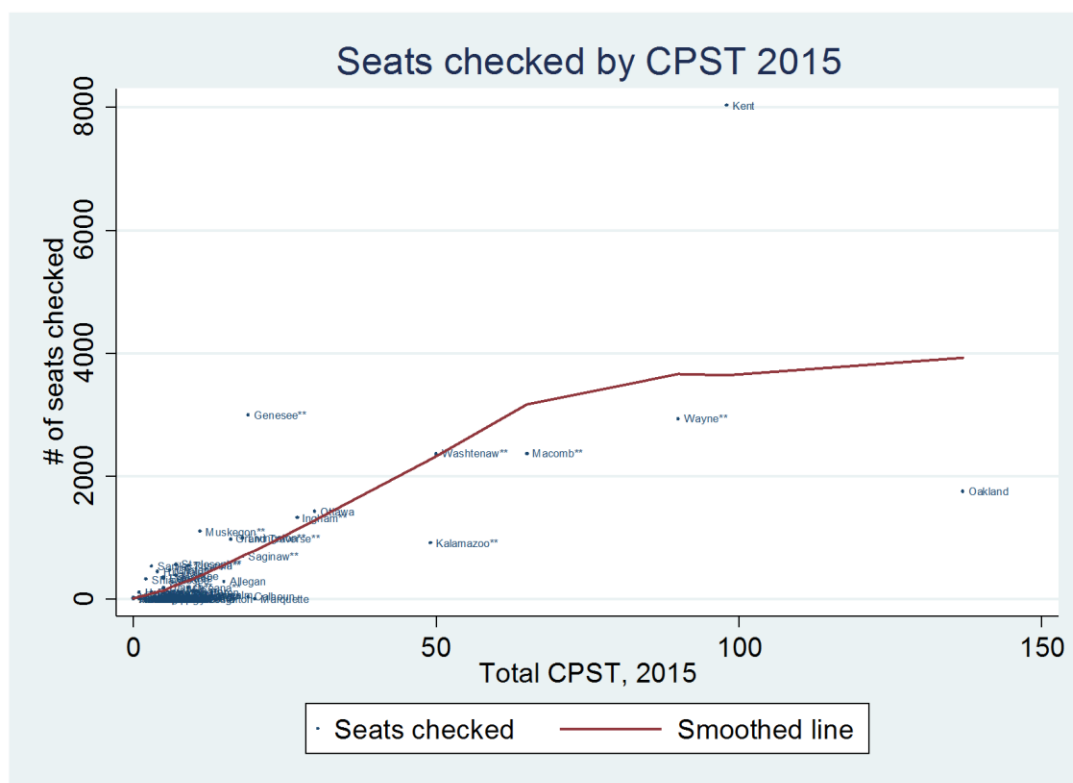


**Figure 44.** Safe Kids Michigan seat checks resulting in change



**Figure 45.** Safe Kids Michigan seat checks where a seat was provided

Figure 46 shows the relationship between the total number of Safe Kids Michigan Coalition seat checks from 2010 to 2014 and the number of CPSTs per county in Michigan in July 2015 (n=973). Points on the plot are labeled with county names. The number of seats checked increased sharply as the number of CPSTs increased from zero to 50 and the curve flattened above 50 CPSTs. Kent County was an outlier, with a high number of seats checked (8,028) by a high number of CPSTs (98). Genesee County had a higher number of seats checked (2,991) relative to the number of CPSTs in the county (19) while Oakland County (1,751) had a lower number of seats checked relative to the number of CPSTs in the county (137). The Pearson correlation coefficient between seat checks and CPSTs per county was 0.74.



**Figure 46.** Total seat checks 2010-2014 relative to number of CPSTs in 2015

### OHSP-Provided Seats

Paper records from OHSP and summary reports from the KARS director in the Upper Peninsula revealed that OHSP distributed nearly 15,500 child restraint systems to 89 agencies or CPSTs in the Lower Peninsula and 21 locations in the Upper Peninsula. Agency addresses mapped with high success (98%).

Table 20 shows per county the total number of CPSTs and the high activity CPSTs in 2015, the number of seats checked and seats provided by Safe Kids Michigan Coalitions from 2010 to 2015 based on participant home address, and the number of seats distributed through OHSP from 2011 to 2014 based on the location of the agency or CPST who received the seats. About 40% of the OHSP paper records appeared to be Safe Kids forms. Therefore, there is potential for “double counting” of seats provided by Safe Kids Michigan Coalitions and the seats distributed through OHSP but there is no efficient way to cross-reference the scanned data against the paper records from OHSP.

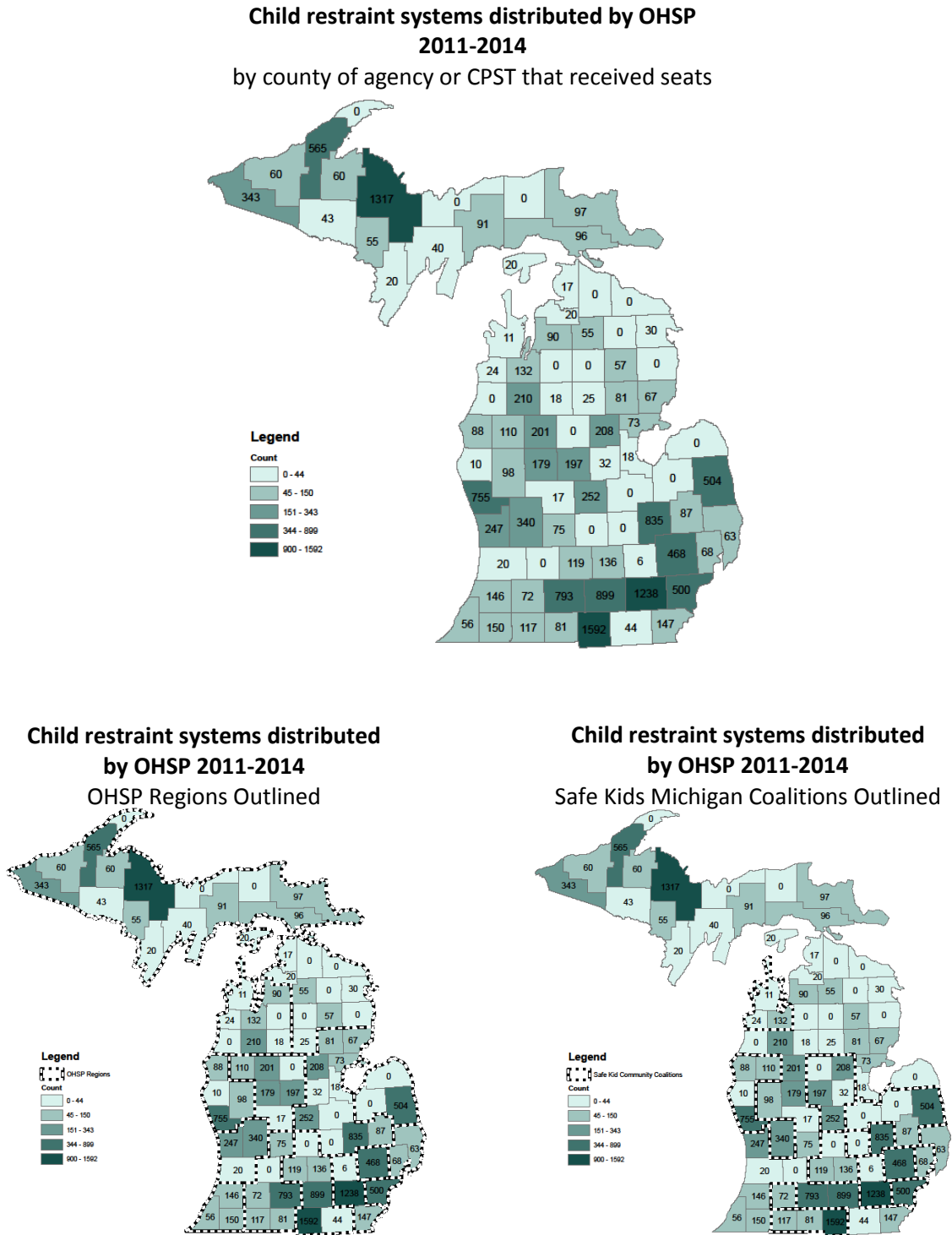
**Table 20.** High-activity CPSTs, Safe Kids services, and OHSP seats by county

County	2015 CPSTs	Safe Kids Michigan		OHSP
	Count from OHSP List (Count of High Activity CPSTs per 2015 Survey)	Seats Checked 2010-2015	Seats Provided 2010-2015	Seats Distributed 2011-2014
Statewide	971 (174)	33,998	15,756	15,447
<b>1 Upper Peninsula</b>				
Alger	1 (0)	-	-	-
Baraga	5 (2)	-	-	60
Chippewa	4 (0)	1	0	97
Delta	5 (1)	-	-	40
Dickinson	3 (1)	-	-	55
Gogebic	9 (1)	-	-	343
Houghton	11 (3)	2	1	565
Iron	1 (0)	-	-	43
Keweenaw	0 (0)	3	1	-
Luce	1 (0)	-	-	-
Mackinac	4 (0)	1	0	96
Marquette	20 (2)	2	0	1317
Menominee	2 (0)	2	2	20
Ontonagon	3 (0)	3	2	60
Schoolcraft	3 (1)	1	0	91
<b>2 Traverse Bay Area</b>				
Antrim	3 (0)	23	1	90
Benzie**	3 (1)	108	34	24
Grand Traverse**	16 (3)	977	175	132
Kalkaska	0 (0)	29	4	-
Leelanau**	1 (7)	98	18	11
Manistee	3 (0)	10	2	-
Missaukee	2 (0)	3	0	18
Wexford	3 (1)	29	6	347
<b>3 Northern Lower</b>				
Alcona	0 (0)	2	2	-
Alpena	5 (1)	-	-	30
Charlevoix	3 (0)	4	1	20
Cheboygan	2 (0)	-	-	-
Crawford	1 (0)	2	1	-
Emmet	5 (1)	6	1	17
Montmorency	0 (0)	2	0	-
Oscoda	0 (0)	7	1	57
Otsego	4 (0)	28	11	55
Presque Isle	1 (0)	2	1	-
Roscommon	3 (0)	-	-	25
<b>4 Lakeshore</b>				
Mason**	6 (2)	92	37	88
Muskegon**	11 (5)	1097	838	841
Newaygo	9 (1)	55	32	112
Oceana**	9 (1)	183	117	10
<b>5 Chippewa Valley</b>				
Clare**	1 (1)	1	0	-
Isabella**	7 (5)	39	21	197
Lake**	1 (0)	37	23	110
Mecosta	9 (0)	5	2	184
Montcalm	11 (2)	67	41	17
Osceola	6 (0)	1	1	270

6 Saginaw Valley				
	High Activity CPSTs	Seats Checked 2010-2015	Seats Provided 2010-2015	Seats Distributed 2011-2014
Arenac	2 (1)	2	2	69
Bay	13 (3)	43	12	18
Genesee**	19 (4)	2991	2072	945
Gladwin**	0 (0)	11	2	208
Gratiot**	4 (2)	21	5	252
Iosco	1 (2)	5	2	67
Lapeer**	3 (3)	95	44	87
Midland**	9 (2)	34	10	32
Ogemaw	4 (1)	6	2	81
Saginaw**	18 (1)	695	537	-
Shiawassee	2 (0)	320	137	-
7 Thumb Area				
Huron	1 (0)	110	60	-
Sanilac**	3 (2)	536	353	504
Tuscola**	9 (0)	545	287	-
8 West Michigan				
Allegan	15 (1)	284	123	20
Kent**	98 (19)	8028	3783	326
Ottawa	30 (7)	1422	689	247
9 Southwest				
Berrien	8 (2)	14	5	56
Cass	10 (1)	45	23	150
Van Buren	8 (0)	105	31	158
10 South Central				
Barry	10 (1)	113	49	-
Branch**	5 (2)	189	117	81
Calhoun	19 (6)	38	24	801
Ionia	3 (2)	99	41	93
Kalamazoo**	49 (3)	911	377	87
St. Joseph**	7 (2)	567	372	117
11 Capital Area				
Clinton**	6 (0)	470	179	-
Eaton**	5 (1)	337	57	125
Hillsdale**	4 (1)	448	290	1449
Ingham**	27 (4)	1318	278	136
Jackson	5 (0)	42	19	1367
Lenawee	5 (2)	353	204	44
12 Huron Valley				
Livingston**	18 (3)	994	468	6
Monroe	7 (1)	380	178	114
Washtenaw**	50 (13)	2366	803	1235
13 Wayne				
Wayne**	90 (11)	2937	1926	500
14 Oakland				
Oakland**	137 (20)	1751	357	490
15 Macomb/St. Clair				
Macomb**	65 (7)	2365	435	68
St. Clair	5 (3)	86	27	72

\*\*Safe Kids Michigan Coalition covered county

The county-level number and distribution of OHSP-provided seats are presented in Figure 47.



**Figure 47.** OHSP seats distributed per county



## Chapter 8. Match of Needs and Resources

### METHODS

We took several approaches to examine the match of child passenger safety needs and resources.

First, we assessed the number of children  $\leq 4$  years, children 5 to 9 years, and CPSTs per OSHP Region and per county in 2014. We then calculated the number of children per CPST, again at the regional and county levels. We mapped the number of children ( $\leq 9$  years) per CPSTs per county. We determined the ratio of the number of children to the number of CPSTs was easier to interpret than a CPST to child ratio as the result is a whole number. The other advantage of this approach is that the results can be tied back to our estimates of the number of seats checked by CPSTs in the low, medium, and high-activity levels presented in Chapter 5. We utilized the county population estimates from the U.S. Census Bureau and published by the Kids Count data center<sup>25</sup> to obtain estimates of the child population in the  $\leq 4$ -year-old and 5- to 9-year-old age groups in 2014.

Second, we examined child passenger safety services, including Safe Kids Michigan seat checks, coalition provided seats, and seats distributed through OHSP in relation to the child population  $\leq 4$  years old by region. We focused on the  $\leq 4$  year old child population for this analysis recognizing most seat checks are conducted with caregivers of young children.<sup>26</sup> We calculated the number of Safe Kids Michigan seat checks and the number of seats provided by Safe Kids Michigan Coalitions and distributed through OHSP per child  $\leq 4$  years per OHSP Region.

Third, we estimated the distances families would have to travel to reach the nearest car seat check location (inspection station or event). We used the home address provided by participants on the Safe Kids Michigan seat check forms. The seat check inspection station and event locations, as shown in Chapter 6, were obtained from CPSTs through interviews and were not exclusively Safe Kids Michigan Coalition seat check locations. All Michigan roads were loaded as networks that allow families access to the car seat check points. Estimated travel distances were calculated using ArcGIS Desktop 10.3.1 (ESRI, Inc., Redlands, CA). The median estimated travel distance in miles was calculated for each county.

Fourth, we executed Network Analyst Location-Allocation functions in ArcGIS Desktop 10.3.1 (ESRI, Inc., Redlands, CA) to test the capacity of the current system. The Michigan roads network allowed the 979 CPSTs in 2014 to travel from their work address (or home if no work address was provided) to the centroids of the 2767 census tracts in the state. We performed calculations where the census tracts were weighted by the population of the children  $\leq 9$  years old and also weighted by Risk (based on Score 5) multiplied by the population of the children  $\leq 9$  years old. There are 41 census tracts that contained no children. For these calculations, CPSTs were allowed to travel as far as 300 miles to provide service at a census tract centroid. We assessed the travel distances for CPSTs to service no more than 150, 420, and 1,500 risk-weighted children. The 150 scenario was chosen as a crude baseline approximation for a CPST dedicated to providing service to 50 child restraint systems per year. We determined the number of census tracts that would be serviced in each scenario. We created “Spider Maps” that graphically represent the “as the crow flies” distance between a CPST and census tract centroid where their services were assumed to be provided for the purposes of these analyses. The “as the crow flies” distance is presented in the maps only for visual simplicity while the location-allocation analyses utilized the actual

distance between the CPST and census tract centroid as calculated along the road network. The results are one set of solutions but do not represent all possible solutions.

Fifth, we generated and mapped Thiessen polygons to define theoretical service territories for the current CPST workforce. Each polygon contains the address of only one CPST. The polygons bound the area around each CPST's address so that any location inside the polygon is closer to the CPST's address within than it is to any of the other CPST's addresses.

## RESULTS

### Children per CPST

The number of CPSTs, children, and children per CPST are shown by region in Table 21. The two regions with the lowest number of children per CPST were the Upper Peninsula and Lakeshore, while the two regions with the highest number of children per CPST were Capital Area and Wayne.

**Table 21.** Children, CPSTs, and children per CPST per OHSP Region

OHSP Region	Children ≤4 years in 2014	Children 5 to 9 years in 2014	CPSTs per in 2014	Children ≤4 years per CPST	Children 5 to 9 years per CPST
<b>Statewide</b>	<b>570,929</b>	<b>720,566</b>	<b>979</b>	<b>583</b>	<b>736</b>
1 Upper Peninsula	14,477	15,798	65	223	243
2 Traverse Bay Area	12,255	13,691	34	360	403
3 Northern Lower	9,464	10,729	25	379	429
4 Lakeshore	16,497	17,836	39	423	457
5 Chippewa Valley	12,300	13,377	37	332	362
6 Saginaw Valley	59,817	64,425	82	729	786
7 Thumb Area	6,427	7,262	15	428	484
8 West Michigan	68,457	71,372	150	456	476
9 Southwest	17,006	17,456	31	549	563
10 South Central	37,047	39,855	86	431	463
11 Capital Area	42,978	45,279	46	934	984
12 Huron Valley	36,036	39,333	79	456	498
13 Wayne	115,331	230,480	96	1,201	2,401
14 Oakland	68,027	73,209	131	519	559
15 Macomb/St. Clair	54,810	60,464	63	870	960

The ratios of children per CPST in 2014 per county are presented in Table 22 for the ≤4-year-old age group, the 5- to 9-year-old age group, and the overall population of children ≤9 years. Counties are listed in rank order from fewest children ≤9 years old per CPST to most children ≤9 years old per CPST, the names of the top 20% and bottom 20% of counties are highlighted in green and red respectively.

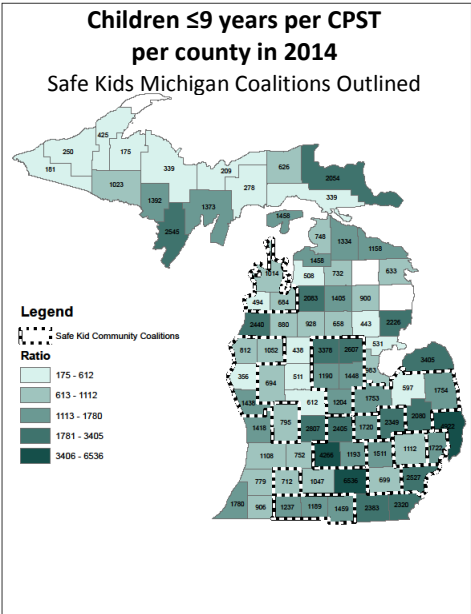
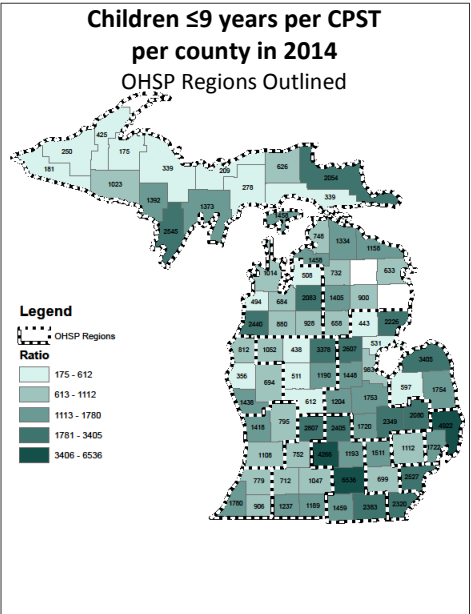
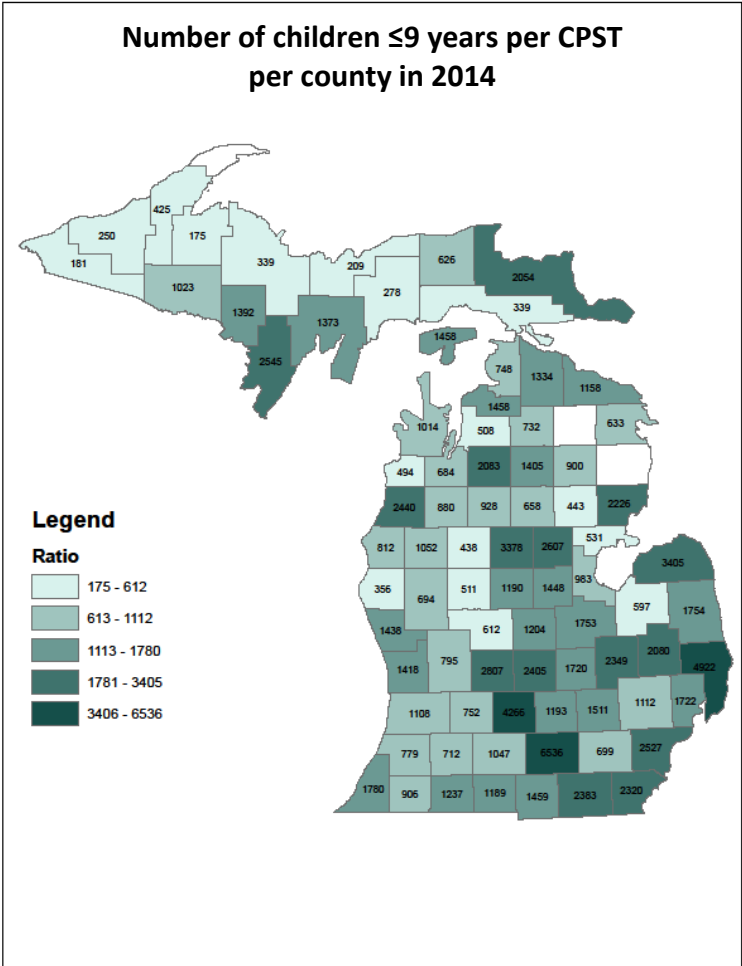
**Table 22.** Children ≤4 years and 5 to 9 years old per CPST by county

OHSP Traffic Safety Region	County	Children per CPST ≤4 year olds	Children per CPST 5 to 9 year olds	Children per CPST ≤9 year olds
<b>Statewide</b>	<b>N/A</b>	<b>583</b>	<b>736</b>	<b>1,319</b>
1 Upper Peninsula	Gogebic	77	89	166
1 Upper Peninsula	Baraga	78	92	170
1 Upper Peninsula	Alger	81	99	180
1 Upper Peninsula	Ontonagon	76	107	183

1 Upper Peninsula	Schoolcraft	122	132	254
1 Upper Peninsula	Mackinac	140	164	304
1 Upper Peninsula	Marquette	166	175	341
<b>OHSP Traffic Safety Region</b>	<b>County</b>	<b>Children per CPST 0 to 4 year olds</b>	<b>Children per CPST 5 to 9 year olds</b>	<b>Children per CPST 0 to 9 year olds</b>
4 Lakeshore	Oceana	163	180	343
5 Chippewa Valley	Osceola	188	209	397
1 Upper Peninsula	Houghton	193	212	405
6 Saginaw Valley	Ogemaw	196	208	405
2 Traverse Bay Area	Benzie	184	227	411
2 Traverse Bay Area	Antrim	199	240	439
3 Northern Lower	Roscommon	224	251	475
5 Chippewa Valley	Mecosta	232	247	479
7 Thumb Area	Tuscola	246	282	528
1 Upper Peninsula	Luce	268	289	557
3 Northern Lower	Alpena	265	306	571
2 Traverse Bay Area	Grand Traverse	305	324	629
4 Lakeshore	Newaygo	306	338	644
12 Huron Valley	Washtenaw	329	339	668
3 Northern Lower	Otsego	324	347	672
3 Northern Lower	Emmet	321	358	678
5 Chippewa Valley	Montcalm	323	358	681
10 South Central	Barry	316	367	683
10 South Central	Kalamazoo	342	357	699
6 Saginaw Valley	Arenac	312	389	701
6 Saginaw Valley	Bay	343	386	730
9 Southwest	Cass	355	381	736
10 South Central	Calhoun	327	396	768
8 West Michigan	Kent	394	395	789
4 Lakeshore	Mason	379	417	796
9 Southwest	Van Buren	398	407	805
3 Northern Lower	Oscoda	378	441	819
4 Lakeshore	Muskegon	408	436	843
2 Traverse Bay Area	Missaukee	460	462	921
2 Traverse Bay Area	Leelanau	411	512	923
5 Chippewa Valley	Lake	395	556	951
5 Chippewa Valley	Isabella	470	500	970
1 Upper Peninsula	Iron	478	515	993
2 Traverse Bay Area	Kalkaska	481	524	1005
3 Northern Lower	Presque Isle	470	540	1010
14 Oakland	Oakland	493	531	1023
2 Traverse Bay Area	Wexford	507	568	1075
6 Saginaw Valley	Gratiot	539	575	1114
10 South Central	Branch	538	581	1119
3 Northern Lower	Cheboygan	509	617	1126
8 West Michigan	Allegan	525	609	1134
10 South Central	St. Joseph	565	614	1179
12 Huron Valley	Livingston	544	655	1199
3 Northern Lower	Crawford	564	679	1243
1 Upper Peninsula	Delta	624	666	1290
6 Saginaw Valley	Midland	618	703	1321
1 Upper Peninsula	Dickinson	644	693	1336
11 Capital Area	Ingham	702	688	1390

8 West Michigan		Ottawa	673	739	1412
11 Capital Area		Clinton	697	816	1514
7 Thumb Area		Sanilac	739	833	1572
<b>OHSP Traffic Safety Region</b>		<b>County</b>	<b>Children per CPST 0 to 4 year olds</b>	<b>Children per CPST 5 to 9 year olds</b>	<b>Children per CPST 0 to 9 year olds</b>
11 Capital Area		Hillsdale	840	918	1758
15 Macomb/St. Clair		Macomb	863	943	1806
6 Saginaw Valley		Lapeer	844	1012	1856
9 Southwest		Berrien	939	952	1891
6 Saginaw Valley		Shiawassee	892	1010	1902
1 Upper Peninsula		Chippewa	926	995	1921
2 Traverse Bay Area		Manistee	916	1130	2046
6 Saginaw Valley		Saginaw	1025	1046	2070
12 Huron Valley		Monroe	1004	1112	2116
6 Saginaw Valley		Genesee	1034	1093	2128
6 Saginaw Valley		Iosco	1156	1108	2264
11 Capital Area		Lenawee	1102	1181	2283
1 Upper Peninsula		Menominee	1125	1226	2351
11 Capital Area		Eaton	1165	1244	2409
6 Saginaw Valley		Gladwin	1201	1254	2455
13 Wayne		Wayne	1309	1311	2619
10 South Central		Ionia	1218	1407	2626
3 Northern Lower		Charlevoix	1258	1402	2660
7 Thumb Area		Huron	1502	1665	3167
15 Macomb/St. Clair		St. Clair	2050	2385	4434
11 Capital Area		Jackson	2197	2421	4618
1 Upper Peninsula		Keweenaw	Children 84 : CPSTs 0	Children 106 : CPSTs 0	Children 190 : CPSTs 0
3 Northern Lower		Alcona	Children 319 : CPSTs 0	Children 351 : CPSTs 0	Children 670 : CPSTs 0
3 Northern Lower		Montmorency	Children 338 : CPSTs 0	Children 370 : CPSTs 0	Children 708 : CPSTs 0
5 Chippewa Valley		Clare	Children 1665 : CPSTs 0	Children 1697 : CPSTs 0	Children 3662 : CPSTs 0





**Figure 48.** Children  $\leq 9$  years per CPST per county

## Child Passenger Safety Services per Child

Table 23 summarizes the child passenger safety services per child by region. The Thumb Area, West Michigan, South Central, Traverse Bay Area, and Huron Valley Regions had the highest number of Safe Kids checks per child  $\leq 4$  years (each greater than 0.09). The Northern Lower and Southwest Regions were lowest (less than 0.01 per child  $\leq 4$  years). The Thumb Area and Upper Peninsula Regions had the highest number of seats provided per child (0.19) and Oakland and Macomb/St. Clair the lowest (0.01). Again, we note the potential for “double counting” of seats provided by Safe Kids Michigan Coalitions and the seats distributed through OHSP due to the lack of an efficient way to cross-reference the scanned data against the paper records from OHSP.

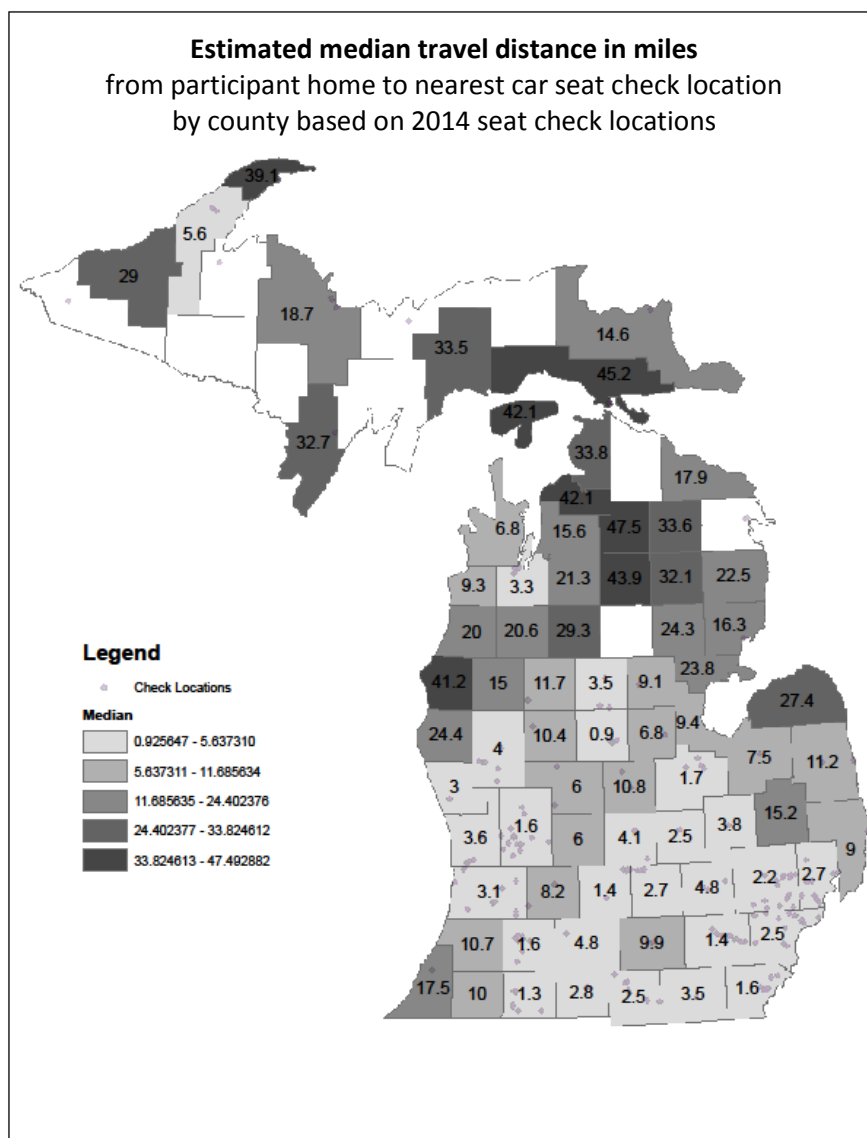
**Table 23.** Child passenger safety services per child population  $\leq 4$  years by region

OHSP Region	Children $\leq 4$ years in 2014	Safe Kids Checks 2010-2015	Safe Kids Checks per child $\leq 4$	Safe Kids Provided Seats 2010-2015	OHSP Seats Distributed 2010-2015	Total Seats (Safe Kids +OHSP)	Total Seats per child $\leq 4$
<b>Statewide</b>	570,929	33,998	<b>0.06</b>	15,765	15,447	31,203	<b>0.05</b>
<b>1 Upper Peninsula*</b>	14,477	15	<b>0.001</b>	6	2,787	2,793	<b>0.19</b>
<b>2 Traverse Bay Area</b>	12,255	1,277	<b>0.10</b>	240	622	862	<b>0.07</b>
<b>3 Northern Lower</b>	9,464	53	<b>0.005</b>	18	204	222	<b>0.02</b>
<b>4 Lakeshore</b>	16,497	1,427	<b>0.09</b>	1,024	1,051	2,075	<b>0.06</b>
<b>5 Chippewa Valley</b>	12,300	150	<b>0.01</b>	88	778	866	<b>0.07</b>
<b>6 Saginaw Valley</b>	59,817	4,223	<b>0.07</b>	2,825	1,759	4,584	<b>0.08</b>
<b>7 Thumb Area</b>	6,427	1,191	<b>0.18</b>	700	504	1,204	<b>0.19</b>
<b>8 West Michigan</b>	68,457	9,734	<b>0.14</b>	4,595	593	5,188	<b>0.07</b>
<b>9 Southwest</b>	17,006	164	<b>0.009</b>	59	364	423	<b>0.02</b>
<b>10 South Central</b>	37,047	1,917	<b>0.11</b>	980	1,179	2,159	<b>0.06</b>
<b>11 Capital Area</b>	42,978	2,968	<b>0.07</b>	1,027	3,121	4,148	<b>0.10</b>
<b>12 Huron Valley</b>	36,036	3,740	<b>0.10</b>	1,449	1,355	2,804	<b>0.08</b>
<b>13 Wayne</b>	115,331	2,937	<b>0.02</b>	1,926	500	2,426	<b>0.02</b>
<b>14 Oakland</b>	68,027	1,751	<b>0.02</b>	357	490	847	<b>0.01</b>
<b>15 Macomb/St. Clair</b>	54,810	2,451	<b>0.04</b>	462	140	602	<b>0.01</b>

\*There were no Safe Kids Michigan Coalitions in the Upper Peninsula during the study period.

## Estimated Travel Distances to Seat Check Locations

The estimated median road travel distances from participant home addresses to the nearest car seat check locations, within counties with at least one Safe Kids Michigan car seat check participant, are shown in Figure 49 and Table 24. Counties with no values did not have record of a resident who attended a Safe Kids Michigan Coalition seat check during the study period. Median estimated travel distances were less than 1.5 miles in Isabella, St. Joseph, Eaton, and Washtenaw Counties and more than 40 miles in Mason, Charlevoix, Crawford, Mackinac, and Otsego Counties.



**Figure 49.** Estimated family travel distances to seat check locations by county



**Table 24.** Estimated family travel distance to seat check locations by county

	County	Median Distance from Participant Home Addresses to nearest Seat Check Locations in Miles
<b>Statewide</b>		2.26
<b>1. Upper Peninsula</b>	Chippewa	14.63
	Houghton	5.64
	Keweenaw	39.13
	Mackinac	45.23
	Marquette	18.69
	Menominee	32.66
	Ontonagon	28.98
	Schoolcraft	33.51
<b>2. Traverse Bay Area</b>	Antrim	15.57
	Benzie	9.29
	Grand Traverse	3.27
	Kalkaska	21.34
	Leelanau	6.77
	Manistee	20.01
	Missaukee	29.30
	Wexford	20.57
<b>3. Northern Lower</b>	Alcona	22.47
	Charlevoix	42.09
	Crawford	43.87
	Emmet	33.82
	Montmorency	33.60
	Oscoda	32.10
	Otsego	47.49
	Presque Isle	17.94
<b>4. Lakeshore</b>	Mason	41.24
	Muskegon	3.00
	Newaygo	3.97
	Oceana	24.40
<b>5. Chippewa Valley</b>	Clare	3.53
	Isabella	0.93
	Lake	15.02
	Mecosta	10.39
	Montcalm	6.03
	Osceola	11.69
<b>6. Saginaw Valley</b>	Arenac	23.81
	Bay	9.36
	Genesee	3.76
	Gladwin	9.07
	Gratiot	10.83
	Iosco	16.29
	Lapeer	15.18
	Midland	6.81
	Ogemaw	24.28
	Saginaw	1.68
	Shiawassee	2.51
<b>7. Thumb Area</b>	Huron	27.43
	Sanilac	11.17
	Tuscola	7.49

8. West Michigan	Allegan	3.07
	Kent	1.61
	Ottawa	3.58
9. Southwest	Berrien	17.51
	Cass	10.04
	Van Buren	10.66
10. South Central	Barry	8.22
	Branch	2.82
	Calhoun	4.78
	Ionia	6.04
	Kalamazoo	1.65
	St. Joseph	1.26
11. Capital Area	Clinton	4.11
	Eaton	1.41
	Hillsdale	2.53
	Ingham	2.73
	Jackson	9.90
	Lenawee	3.49
12. Huron Valley	Livingston	4.84
	Monroe	1.60
	Washtenaw	1.44
13. Wayne County	Wayne	2.54
14. Oakland County	Oakland	2.23
15. Macomb/St. Clair Counties	Macomb	2.66
	St. Clair	9.05

### CPST Capacity and Service Areas

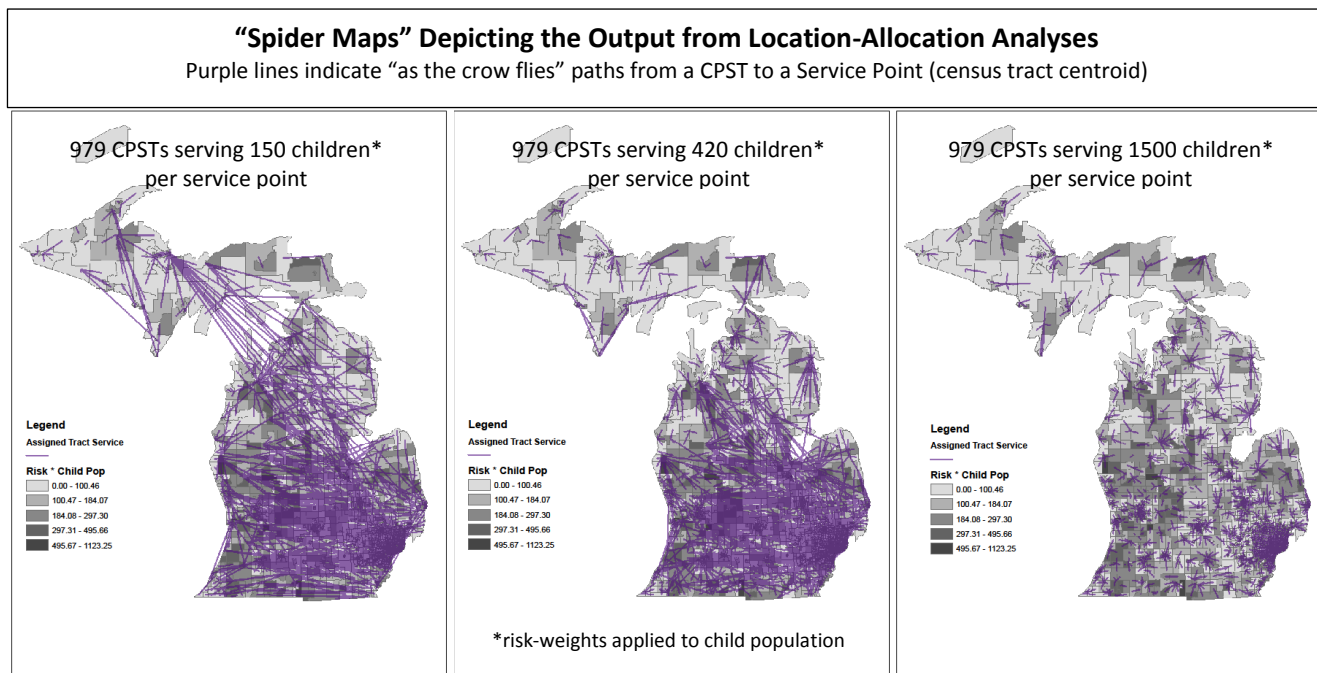
Based on the location of CPSTs in 2014, the system did not have the capacity to meet the needs of all Michigan children  $\leq 9$  years as the allocation scenarios borrow capacity from technicians that are greater distances away. Despite the limits to the CPST capacity in the system, our analyses found that the 2014 CPST technician locations align better with the locations of our risk-weighted child census tract's demand than they do with the locations of the pure child population census tract's demand (Table 25). In other words, the CPSTs were located in areas where they could meet the needs of the children estimated to be at greatest risk for suboptimal child passenger safety behaviors.

**Table 25.** Location-Allocation derived CPST travel distance to service points

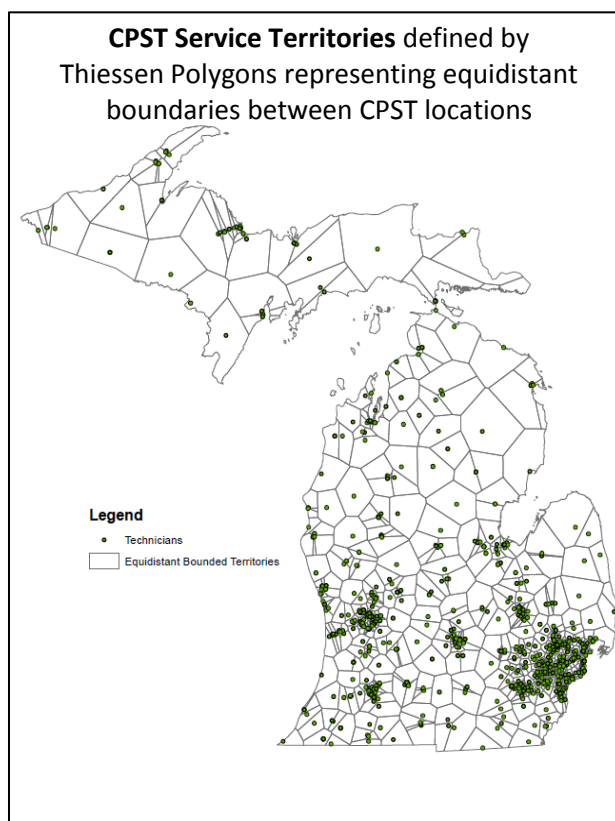
Risk-adjusted population of children $\leq 9$ serviced by 979 CPSTs	CPST travel distance to service points (census tract centroid)		Census tracts served	Census tracts not served**
	Median (mi)	Mean (mi)		
150	14.4	33.1	1515	1252
420	11.1	23.1	2598	169
1500	2.6	4.3	2720	47
1500 (not risk adjusted)	5.5	12	2712	55

\*\*including 41 tracts with no children  $\leq 9$  years

Figure 50 shows the Spider Maps that depict results of the location-allocation analysis. Figure 51 shows the service territories based on the current locations of CPSTs defined by Thiessen polygons.



**Figure 50.** Location-Allocation analysis “Spider Maps”



**Figure 51.** CPST service territories based on current CPST location

## Chapter 9. Discussion, Limitations, Conclusions, Recommendations

### DISCUSSION

This study characterized child passenger safety resources in Michigan in terms of quantity, location, and service delivery from 2010 through 2014 and in relation to the child population at greatest need for these resources. This study is the first to our knowledge to assess child passenger safety resource needs based on socio-demographic characteristics at a population level using data available from the U.S. Census and the American Community Survey. We also surveyed child passenger safety technicians (CPSTs) throughout Michigan to gather new information about the workforce that is primarily responsible for promotion of child passenger safety best practices.

#### Population at Risk for Suboptimal Child Passenger Safety Behaviors

We took a novel approach to identify the areas (primarily counties) where children at greatest risk for suboptimal child passenger safety behaviors live by calculating six composite Risk Scores. The composite Risk Scores were derived from factors made up of variables that served as area-based indicators of the relevant child population ( $\leq 9$  years), racial and ethnic minority and non-English speaking populations, poverty, low educational attainment, and crash-related risk. Although the risk indicator variables used in our analyses were selected based on research showing an association with suboptimal child passenger restraint use, the spatial correlation among these indicators in Michigan is small. In other words, the counties with the greatest risk and presumed need for child passenger safety resources based on the composite scores differed from counties considered at risk based on each factor independently. The low spatial correspondence of risk indicator variables illustrates the multidimensional nature of child passenger safety resource needs. Clearly composite Risk Scores, such as those used in this research, are needed to obtain a clear picture of the overall distribution of risk for suboptimal child passenger safety behaviors at the population level.

For our analyses, we developed adjusted composite Risk Scores rather than an unweighted summed indicator of risk because not all of the variables were expected to have equal contributions to suboptimal child passenger safety behaviors. We present results from six Risk Score calculations based on different weighting schemes assigned to the contributing factors. The assignment of weights to the individual factors, were based on our current understanding of the contribution of these factors to child passenger safety behaviors. Our analyses demonstrate that taking different approaches to the adjustment for the relevant child population (including the child population as a factor or weighting the composite risk score by the size of the child population) resulted in the greatest changes in rank order of counties based on Risk Scores. Otherwise, small adjustments to the weighting approach did not alter the Risk Scores for each county in a meaningful way. We selected Score 5 as the focus of our results as it was deemed most representative of the concentration of the population of children  $\leq 9$  years in Michigan and the distribution of socio-demographic characteristics that would be expected to place a child at higher risk for suboptimal child passenger safety behaviors. We acknowledge that the Risk Scores developed for this study have not been externally validated. Therefore, the inclusion of specific variables and the allocation of the weights could be debated. For example, one could argue for the inclusion of a measure of the current child passenger safety resources in the Risk Score. We opted against this approach as we viewed the child passenger safety resources as modifiable and protective factors that did not align with the framework we established for the Risk Scores.

## **Child Passenger Safety Resources**

By surveying CPSTs throughout Michigan, we were able to reveal information not previously known about this population. The responding CPSTs shared their reasons for becoming a CPST and maintaining their certification, special skills that they possess, and their service to children and families. Our overall response rate, around 50%, is a good response rate for a web-based survey of professionals that offered limited incentive for participation. Although survey response rates by county were variable, ranging from 30-81 percent, we received responses from at least one CPST in all but five counties that have CPSTs. The numbers of respondents corresponded closely to the number of total CPSTs in each county, thereby providing data that are reasonably characteristic of the state and the distribution of CPSTs across counties.

We assessed the number of child passenger safety technicians (CPSTs) throughout Michigan based on addresses reported by CPSTs to OHSP over the 4-year study period and based on ZIP Codes reported by CPSTs who responded to our survey in 2015. Considering both data sources, all of the counties except three (Keweenaw, Montmorency and Alcona) had at least one CPST at some point between 2012 and 2015; however, most counties did not have any specialized CPSTs who were instructors, trained to work with children with special needs, or Spanish speaking. Most counties had small numbers of CPSTs (e.g., <10). The counties with the largest number of CPSTs were located in areas with the greatest number of children, all in the southern Lower Peninsula of Michigan. The concentration of CPSTs in the Lower Peninsula may in part be related to the presence of 13 Safe Kids Michigan Coalitions that cover only 30 counties located in the Lower Peninsula of the state.

Many CPSTs take their initial training because it is required for their employment. The most common motivations to maintain status as a CPST include filling a gap in available community services, because it is a natural fit, and to fulfill a job requirement. Even though CPST recertification rates are typically between 50-60% nationally, the number of CPSTs in Michigan has been steady over the past 5 years above 900 and the number of CPST instructors has remained around 50. From 2012-2015 the net change in CPSTs and CPST-Is combined was 19. The OHSP Region that gained the largest number of CPSTs and CPST-Is was Oakland followed by West Michigan. The Capital Area and Southwest Regions had the greatest declines in CPSTs and CPST-Is followed by the Northern Lower Region.

The two factors that CPSTs reported to most influence their participation in car seat checks were the time of day and the distance to the seat check. The latter of these two has important implications for the activity levels and perhaps also the effective number of technicians in counties that have low population densities and longer distances between cities and towns. In contrast, the sheer number of CPSTs available to meet the large number of children in heavily populated areas is a bigger limitation than distance to seat check locations. Geographic differences, including population density, must be considered in solutions designed to address the unmet child passenger safety needs unique to urban centers and rural areas of the state. For example, a large increase in CPSTs in an area with sparse population may be less effective than strategic organization of the current CPSTs in that area in order to increase the person hours available to meet the need for services.

In many counties, the estimated distance families have traveled from home to the nearest seat check location was relatively small, 10 miles or less. With the data available, we do not know if these short travel distances are the result of well-positioned seat check locations or indicative of a service that is only being accessed by families who live within close proximity. Our location-allocation analyses would

suggest that the current CPST workforce is better positioned to meet the needs of children at greater risk for suboptimal child passenger safety behaviors than it is to service the child population in general.

Among CPSTs responding to our survey, about 20% reported they were paid, 40% volunteered their time, and the rest reported both being paid and volunteering their time to conduct car seat checks. The CPSTs with the highest activity level most often had a combination of volunteer and paid efforts. Because CPSTs vary in the frequency and amount of seat checks they conduct in a given year, measurement of the raw number of CPSTs in an area will be insufficient for ensuring a certain number of children will receive services. Our survey data suggest that the 41% of CPSTs classified as “high activity” are estimated to check more than 85% of the child restraint systems in Michigan. High-activity CPSTs are often those who encounter families as part of their occupation, particularly CPSTs in law enforcement and social services. Providing child passenger safety training as part of the certification programs for first responders and social workers would have a positive, and potentially significant, effect on the number of high activity CPSTs available in Michigan. Providing pay to CPSTs to conduct seat checks at a high activity level would require the identification of new funding streams. Recognizing that many CPSTs provide their services as volunteers, there may be ways to bolster productivity in the volunteer network. For example, OHSP could encourage volunteer CPSTs to align with organizations that have infrastructure to deliver child passenger safety services to families efficiently, such as a Safe Kids Coalition or an active county health department. Another option would be to consider providing financial support to staff Safe Kids Coalitions for counties that are not currently covered, which might allow better coordination of child passenger safety resources within those areas.

Another important limit on access to child passenger safety resources that was identified in our research is the low number of bilingual CPSTs in Michigan. This limits the capacity of the current system to reach populations with high numbers of non-English speakers. Although Spanish was the most commonly reported language other than English spoken by CPSTs, only 3% of the survey population and less than 2% of the CPSTs on the OHSP lists report speaking Spanish. Furthermore, it was surprising that none of the CPSTs responding to our survey indicated fluency in Arabic, Chinese, or Japanese, despite Southeast Michigan having areas of high concentrations of families who primarily speak these languages. Active recruitment of new bilingual CPSTs in areas that have large populations that speak languages other than English would be one approach to ensure children in Michigan have equitable access to these services.

Clearly, CPSTs and seat check locations are not evenly distributed throughout the state, which results in families traveling greater distances to obtain child passenger safety services in some areas. However, the number of children  $\leq 9$  years old per CPST shows that CPSTs working in the Upper Peninsula have fewer children to which they need to provide services than those living in population-dense areas such as Wayne County. The number and locations of car seat checks are greatest where the population and the number of technicians is the greatest. It is intuitive to think in turn that less populated areas in the state with few or no CPSTs are also those with the highest child passenger safety needs; however, this is not the case according to our analyses. Notably, the counties in the Upper Peninsula of Michigan have the fewest CPSTs, yet they also have the lowest numbers of children  $\leq 9$  years per CPST. The overlap of the areas with higher numbers of children per CPSTs and greater concentrations of at risk children suggest that child passenger safety resources are most deficient in areas of the state with higher population density, higher poverty, and higher levels of diversity. However, the number of children per CPST is only one measure of the match between child passenger safety needs and resources.

## **Impact of Car Seat Checks**

We analyzed the impact of Michigan's CPSTs based on the number of child safety seats checked, changes as the result of a car seat check, and the distribution of child restraint systems by Safe Kids Michigan Coalitions and through OHSP. The total number of seat checks conducted by CPSTs affiliated with Safe Kids Michigan peaked in 2012 and there was a sharp decline in the number of seats checks at events in 2013 and 2014 compared with prior years. The decline in seat checks, specifically in seat check events, conducted in affiliation with Safe Kids Michigan may be in part explained by a change in availability of liability insurance coverage for CPSTs through Safe Kids Worldwide. It would be worth exploring this issue further in a future survey of CPSTs. If challenges in obtaining liability insurance for seat checks are reducing the number of CPSTs willing to provide seat checks, OHSP could evaluate the costs and benefits of providing liability insurance coverage to CPSTs in Michigan. This may be a more cost-effective means of increasing seat checks than other approaches.

Our results do indicate that families who receive child passenger safety services from CPSTs affiliated with Safe Kids Michigan are likely to experience a change in restraint type, installation method or seating location. In addition, half of the Safe Kids Michigan seat checks resulted in the provision of a seat. These observations suggest that child passengers are likely to be safer as a result of seat checks. However, we have no direct way to assess the impact of child passenger safety technicians on children involved in crashes as there is no way to link crash records and seat check data at this time. There was an increase in the number of crashes involving a child  $\leq 9$  who was killed, injured, improperly restrained or in the front seat of the vehicle from 2010 to 2014. However, this timeframe coincides with a period of improvement in the economic outlook in Michigan which could contribute to greater exposure to passenger vehicle travel for children.

## **LIMITATIONS**

The primary limitation to the interpretation of our results is that data were available for only some of the seat checks that are conducted in Michigan. Therefore, our results likely underestimate the amount of child passenger safety services currently being provided. We know that seat checks may not be conducted in affiliation with a Safe Kids Coalition and that families do not always receive an OHSP distributed restraint system, but we do not know the extent of our underestimations. On the other hand, there is potential for the records from OHSP to represent the same seat checks that were present in the Safe Kids Michigan data. This would result in an overestimation of the number of child safety seats provided to families in the state. In addition, some of the child passenger safety services accounted for in this study were delivered to families who utilized services for a second or third time in the study period. Families may return for additional seat checks in other family vehicles, with other children in their family, or at points of transition, for example from a rear-facing to forward-facing restraint. If many families received repeat services multiple times in the study period, our results would overestimate the reach of CPSTs in Michigan to some extent. The magnitude of overestimation is unknown.

We noted discrepancies between the data received by OHSP regarding seat distribution. Some CPSTs submitted paper forms for seats that did not include the provision of an OHSP distributed seat with the forms they submitted to document the provision of OHSP distributed seats to families. In addition, some CPSTs submitted duplicate forms for seat checks conducted over different reporting periods. For example, one report submitted in August 2014 contained seat checks from July 2014 and a second

report submitted in September 2014 contained seat checks from June 2014 through August 2014. There were also discrepancies in the recorded counts of seats distributed on the reporting forms and half sheets, and at times these counts differed from the total number of forms submitted by the CPST to support their report. We attempted to reconcile these differences when possible but were limited in the number of staff hours available to hand search for duplicate forms and lacked definitive proof that when a form indicated a seat was provided it represented a seat that was distributed through OHSP.

While we have some information about the location of service providers (CPSTs), the location of seat check inspection stations and events, and the home location of families who received services from CPSTs affiliated with Safe Kids Michigan, the data do not provide any direct links to determine exactly which CPSTs work in which locations or which seat check locations were utilized by any given family. Therefore our results present estimates of travel distances that may be over or under estimations of the true travel distances from CPSTs to service locations and travel distances from family homes to service locations. We also note that child restraint systems distributed through OHSP are provided to CPSTs in a limited number of agencies at specific locations, but there are no known limits on the travel of CPSTs and families across county boundaries. Therefore, we expect that the restraints distributed through OHSP were provided to families who lived near and far from the distribution points (i.e., addresses for specific agencies or CPSTs) that were available for our analyses.

As with all surveys there is potential for participation bias. With our anonymous survey, we have no way to test for differences between responders and non-responders. Given the higher response rate among CPSTs Instructors, we expect survey respondents to represent CPSTs who are more engaged in this work. This would bias our results toward an overestimation of the number of CPSTs at higher activity levels. However, the actual activity level of CPSTs may be higher or lower than we estimated.

The survey results for a few particular questions, specifically related to CPST roles and events versus stations, raise concerns for confusion on the part of the respondents. Respondents seemed confused when asked about their roles as CPST, CPST-I, Senior Checker, Technician Proxy, or Event Coordinator. Respondents may have also had different views of inspection stations and events despite our attempt to provide clear definitions to distinguish the two. We missed the opportunity to ask CPSTs who both work and volunteer why they volunteer and if retired, from what career/job they had retired. These questions could be included in future surveys.

## **RECOMMENDATIONS**

### **Number of Child Passenger Safety Technicians to meet need**

National organizations recommend use of different restraint system types through three child passenger safety stages before transitioning to use of an adult seat belt alone. While there is no specific national recommendation for the number of times a child should have their restraint system checked by a CPST, we propose concrete recommendations to guide decision makers in Michigan. Due to the complexities of selection, installation and use of child restraint systems, we recommend that families seek the assistance of a certified CPST at a minimum of three points in their child's first decade of life:

- 1) at or before birth;*
- 2) when transitioning from a rear-facing to a forward-facing car seat, typically around age 2;*
- 3) when transitioning from a forward-facing car seat to a booster seat, typically around age 5.*



We estimated the number of seat checks per county based on approximations of the number of children at birth, at age 2, and at age 5 per year. To approximate the number of children of these ages we divided the number of children in the two age groups available from the U.S. Census ( $\leq 4$  years and 5-9 years) by 5, the total number of years in each group. We then multiplied the resultant number of children by two for the younger age group and added the resultant number of children in the older age group to determine the number of seat checks needed per year. We then calculated the number of CPSTs needed to complete the 20%, 33%, 50%, and 100% of the recommended number of seat checks, assuming that a CPST can check 50 seats per year (Table 26). Because 50 seat checks per year was the *average* number of seats checked per CPST in our survey data, it is possible that CPSTs would have to work at higher activity levels than they do currently to reach this target. It is estimated that only about 10% of families of young children utilize car seat checks nationally. Therefore, we would hypothesize that increasing the number of CPSTs in Michigan to meet 20% of the seat checks would allow more Michigan children to receive services than the national norms. Several counties (name italicized in Table 26) already have the same or greater numbers of CPSTs than our estimates for the number of CPSTs needed to cover 20% of proposed checks. In addition, CPSTs can provide services across county boundaries.

**Table 26.** CPSTs needed to meet proposed number of seat checks

	<b>Proposed Number of Seat Checks per year</b>	Number of CPSTs in Michigan in 2014	Estimated CPSTs to cover 20% of proposed checks	Estimated CPSTs to cover 33% of proposed checks	Estimated CPSTs to cover 50% of proposed checks	Estimated CPSTs to cover 100% of proposed checks
Statewide	578,836	<b>979</b>	2,315	3,820	5,788	11,577
<b>1 Upper Peninsula</b>	<b>8950</b>	<b>65</b>	<b>36</b>	<b>59</b>	<b>90</b>	<b>179</b>
<i>Alger</i>	209	4	1	1	2	4
<i>Baraga</i>	248	5	1	2	2	5
Chippewa	1138	2	5	8	11	23
Delta	1148	3	5	8	11	23
Dickinson	792	2	3	5	8	16
<i>Gogebic</i>	388	8	2	3	4	8
<i>Houghton</i>	1196	10	5	8	12	24
<i>Iron</i>	294	1	1	2	3	6
Keweenaw	55	0	0	0	1	1
<i>Luce</i>	165	1	1	1	2	3
<i>Mackinac</i>	267	3	1	2	3	5
<i>Marquette</i>	2026	20	8	13	20	41
Menominee	695	1	3	5	7	14
<i>Ontonagon</i>	103	2	0	1	1	2
<i>Schoolcraft</i>	225	3	1	1	2	5
<b>2 Traverse Bay Area</b>	<b>7640</b>	<b>35</b>	<b>31</b>	<b>50</b>	<b>76</b>	<b>153</b>
<i>Antrim</i>	637	5	3	4	6	13
<i>Benzie</i>	476	4	2	3	5	10
<i>Grand Traverse</i>	2990	15	12	20	30	60
Kalkaska	594	1	2	4	6	12
<i>Leelanau</i>	534	2	2	4	5	11
Manistee	592	1	2	4	6	12
<i>Missaukee</i>	552	2	2	4	6	11
<i>Wexford</i>	1265	5	5	8	13	25

	<b>Proposed Number of Seat Checks per year</b>	<b>Number of CPSTs in Michigan in 2014</b>	<b>Estimated CPSTs to cover 20% of proposed checks</b>	<b>Estimated CPSTs to cover 33% of proposed checks</b>	<b>Estimated CPSTs to cover 50% of proposed checks</b>	<b>Estimated CPSTs to cover 100% of proposed checks</b>
<b>3 Northern Lower</b>	<b>5931</b>	<b>25</b>	<b>24</b>	<b>39</b>	<b>59</b>	<b>119</b>
Alcona	198	0	1	1	2	4
Alpena	836	6	3	6	8	17
Charlevoix	784	2	3	5	8	16
Cheboygan	654	2	3	4	7	13
Crawford	361	1	1	2	4	7
Emmet	999	5	4	7	10	20
Montmorency	209	0	1	1	2	4
Oscoda	239	1	1	2	2	5
Otsego	797	4	3	5	8	16
Presque Isle	296	1	1	2	3	6
Roscommon	559	3	2	4	6	11
<b>4 Lakeshore</b>	<b>10166</b>	<b>38</b>	<b>41</b>	<b>67</b>	<b>102</b>	<b>203</b>
Mason	939	4	4	6	9	19
Muskegon	6504	16	26	43	65	130
Newaygo	1710	9	7	11	17	34
Oceana	1013	9	4	7	10	20
<b>5 Chippewa Valley</b>	<b>7595</b>	<b>37</b>	<b>30</b>	<b>50</b>	<b>76</b>	<b>152</b>
Clare	1005	1	4	7	10	20
Isabella	2015	6	8	13	20	40
Lake	269	1	1	2	3	5
Mecosta	1278	9	5	8	13	26
Montcalm	2209	13	9	15	22	44
Osceola	819	7	3	5	8	16
<b>6 Saginaw Valley</b>	<b>36812</b>	<b>82</b>	<b>147</b>	<b>243</b>	<b>368</b>	<b>736</b>
Arenac	405	3	2	3	4	8
Bay	3434	13	14	23	34	69
Genesee	15178	24	61	100	152	304
Gladwin	731	1	3	5	7	15
Gratiot	1322	4	5	9	13	26
Iosco	684	1	3	5	7	14
Lapeer	2700	5	11	18	27	54
Midland	2714	7	11	18	27	54
Ogemaw	601	5	2	4	6	12
Saginaw	6809	14	27	45	68	136
Shiawassee	2234	5	9	15	22	45
<b>7 Thumb Area</b>	<b>4023</b>	<b>15</b>	<b>16</b>	<b>27</b>	<b>40</b>	<b>80</b>
Huron	934	1	4	6	9	19
Sanilac	1387	3	6	9	14	28
Tuscola	1703	11	7	11	17	34
<b>8 West Michigan</b>	<b>41657</b>	<b>150</b>	<b>167</b>	<b>275</b>	<b>417</b>	<b>833</b>
Allegan	4311	14	17	28	43	86
Kent	26507	110	106	175	265	530
Ottawa	10839	26	43	72	108	217
<b>9 Southwest</b>	<b>10294</b>	<b>31</b>	<b>41</b>	<b>68</b>	<b>103</b>	<b>206</b>
Berrien	5660	11	23	37	57	113
Cass	1745	7	7	12	17	35
Van Buren	2889	13	12	19	29	58

	<b>Proposed Number of Seat Checks per year</b>	Number of CPSTs in Michigan in 2014	Estimated CPSTs to cover 20% of proposed checks	Estimated CPSTs to cover 33% of proposed checks	Estimated CPSTs to cover 50% of proposed checks	Estimated CPSTs to cover 100% of proposed checks
<b>10 South Central</b>	<b>22790</b>	<b>86</b>	<b>91</b>	<b>150</b>	<b>228</b>	<b>456</b>
Barry	1997	10	8	13	20	40
Branch	1657	5	7	11	17	33
Calhoun	5019	17	20	33	50	100
Ionia	2306	3	9	15	23	46
Kalamazoo	9370	44	37	62	94	187
St. Joseph	2441	7	10	16	24	49
<b>11 Capital Area</b>	<b>26247</b>	<b>46</b>	<b>105</b>	<b>173</b>	<b>262</b>	<b>525</b>
Clinton	2653	4	11	18	27	53
Eaton	3574	3	14	24	36	71
Hillsdale	1559	4	6	10	16	31
Ingham	9625	27	38	64	96	192
Jackson	5452	3	22	36	55	109
Lenawee	3385	5	14	22	34	68
<b>12 Huron Valley</b>	<b>22281</b>	<b>79</b>	<b>89</b>	<b>147</b>	<b>223</b>	<b>446</b>
Livingston	5925	15	24	39	59	119
Monroe	4992	8	20	33	50	100
Washtenaw	11363	56	45	75	114	227
<b>13 Wayne</b>						
Wayne	69126	96	277	456	691	1383
<b>14 Oakland</b>						
Oakland	41853	131	167	276	419	837
<b>15 Macomb/St. Clair</b>						
Macomb	34017	63	136	225	340	680
Macomb	28830	59	115	190	288	577
St. Clair	5187	4	21	34	52	104

### Tracking of Seat Check Services

Our research has identified some of the challenges and limitations to the current data collected from seat check services. The collection of paper records regarding seat checks and the distribution of child restraint systems is labor intensive; without a standardized approach it is prone to errors. Given the costs associated with the distribution of child restraint systems, it is important to accurately document the service being provided and to assess characteristics about the restraints that have been distributed. An electronic data collection system could increase the standardization of information gathered and improve the ease of analysis of those data. Many CPSTs submitted data on Safe Kids forms or on forms that resembled Safe Kids forms. Therefore there is potential for these data to be extracted using optical recognition software. With the loss of liability insurance coverage through Safe Kids Worldwide, CPSTs may no longer have an incentive to utilize standardized Safe Kids forms to record their findings in a seat check. This is an opportune time for Michigan OHSP to intervene with the development of a standardized, electronic form for collection of data during seat checks. Collection of additional data, including the location of the seat check, work or home location of the CPST, and socio-demographic

characteristics of the families utilizing services, would allow for a richer understanding of the spatial relationships explored in this study.

## **CONCLUSIONS**

We have developed a system to determine the location of children  $\leq 9$  years living in populations with concentrations of socio-demographic characteristics that are expected to place children at higher risk for suboptimal child passenger safety behaviors. Current child passenger safety resources in Michigan are insufficient to provide a seat check to every child but those resources are located in areas where they are likely to be meeting the needs of children with greater risk as we have defined it. Seat checks resulted in change for most families who utilized services from a CPST affiliated with a Safe Kids Michigan Coalition. Expanding the impact of Michigan's child passenger safety resources will require careful planning to optimize the utilization of existing resources and strategic planning to ensure the placement of new services that will efficiently address the needs of at risk children.

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## Appendix A: Example Child Passenger Safety Checklist

**Child Passenger Safety Checklist**  
Use blue, black, or #2 pencil and for mistakes use white-out correction tape.

Fill in boxes, from left to right one letter/number per box 123ABC Fill in circles like this ☐

---

Caregiver First Name (Person Receiving Information)  Caregiver Last Name

Street Address

City  State  Zip

Phone  -  -  Email Address

Vehicle Make/Mfg. (e.g. Chevy, Buick)  Vehicle Model (e.g. Malibu, Enclave)  Vehicle Year

Caregiver signature  Today's Date  /  /

**STOP HERE**

Child Present ☐ Unborn ☐ Yes ☐ No **CHILD NUMBER ONE**

Seat Checked Before? ☐ Yes ☐ No Child's age  { ☐ Days ☐ Month(s) ☐ Year(s) Height  Weight/lbs

Child First Name  Child Birth Date DOB (MM/DD/YYYY)  /  /

**ON ARRIVAL**

1. Child/CSS location in vehicle

☐ front row ☐ back ☐ 3rd row ☐ Other seating location Explain:

2. CSS installed using (select all that apply)

☐ No CSS (Mark - Go to #18) ☐ Integrated Seat (Mark - Go to #17)

☐ Uninstalled ☐ Seatbelt ☐ Tether ☐ Lower anchors

3. Restraint type:

☐ RF only w/o base ☐ RF only w/ base ☐ Base only ☐ RF convertible ☐ FF w/ harness ☐ BP Booster ☐ Lap/Shoulder (Mark - Go to #17) ☐ Lap only (Mark - Go to #17) ☐ Car bed ☐ Vest

4. CSS MFG:

☐ Baby Trend ☐ Britax ☐ Chicco ☐ Combi ☐ Evenflo ☐ Graco ☐ Harmony ☐ Magna/Clek ☐ Orbit ☐ Peg Perego ☐ Recaro ☐ Sunshine Kids

☐ Learning Curve - 1st Years ☐ Dorel (Cosco, Eddie Bauer, Safety 1st, Maxi Cosi) ☐ Other

5. Model Number

6. Mfg Date (MM/DD/YYYY)  /  /

**FINDINGS**

7. CSS history known ☐ Yes ☐ No ☐ N/A

8. CSS involved in a crash ☐ Yes ☐ No

9. CSS labels missing ☐ Yes ☐ No

10. CSS expired ☐ Yes ☐ No

11. CSS recalled ☐ Yes ☐ No

12. CSS correct direction ☐ Yes ☐ No

13. CSS Harness correct ☐ Yes ☐ No ☐ N/A

14. Recline Angle correct ☐ Yes ☐ No ☐ N/A

15. Lower anchors correct ☐ Yes ☐ No ☐ N/A

16. Tether correct ☐ Yes ☐ No ☐ N/A

17. Seatbelt correct ☐ Yes ☐ No ☐ N/A

**ON DEPARTURE**

18. Child/CSS location in vehicle

☐ front row ☐ back ☐ 3rd row ☐ Other seating location Explain:

19. CSS installed using (select all that apply)

☐ No CSS ☐ Integrated Seat (Mark - Go to 25)

☐ Uninstalled ☐ Seatbelt ☐ Tether ☐ Lower anchors

20. Coalition provided a new CSS? ☐ Yes ☐ No

21. Restraint type:

☐ RF only w/o base ☐ RF only w/ base ☐ Base only ☐ RF convertible ☐ FF w/ harness ☐ BP Booster ☐ Lap/Shoulder ☐ Lap only ☐ Car bed ☐ Vest

22. CSS MFG:

☐ Same as 4,5,6 (Mark - Go to 25) ☐ Britax ☐ Chicco ☐ Combi ☐ Evenflo ☐ Graco ☐ Harmony ☐ Magna/Clek ☐ Orbit ☐ Peg Perego ☐ Recaro ☐ Sunshine Kids

☐ Learning Curve - 1st Years ☐ Dorel (Cosco, Eddie Bauer, Safety 1st, Maxi Cosi) ☐ Other

23. Model Number:

24. Mfg Date (MM/DD/YYYY):  /  /

25. ALL CORRECTIONS MADE? ☐ Yes ☐ No

26. CSS/Vehicle Compatible ☐ Yes ☐ No

27. Education materials given ☐ Yes ☐ No

Technician discussed: (Select all that apply)

28. ☐ Airbags ☐ Unused seatbelt ☐ Projectiles ☐ Unattended children in or around cars ☐ Next steps

**Caregiver sign off:**

33. I harnessed child in CSS ☐ Yes ☐ No ☐ N/A

34. I participated/installed CSS today ☐ Yes ☐ No ☐ N/A

Caregiver initials  Donation \$

Comments

Tech Last Name  Tech Number

Senior Checker Last Name  Senior Checker Tech Number

**COALITION #**

☐ EVENT ☐ INSPECTION STATION

Draft

## Appendix B: CPS Technician Survey

### Michigan CPS Tech Survey – Administered Online via Qualtrics®

Q1.1 We want to know about the great child passenger safety work done across Michigan! So, we are asking all Michigan Child Passenger Safety Technicians (CPSTs) to complete this survey.

This survey is voluntary. It should take about 10-15 minutes to finish. You can skip any questions you prefer not to answer.

If you choose to complete the survey, the Michigan Office of Highway Safety Planning (OHSP) has offered to pay for a total of 15 recertification fees among technicians who participate and wish to be entered into the drawing.

NOTE: We designed this survey to be completed on a full screen (laptop, desktop, or tablet). Some questions will be difficult to view on a smart phone. Hit the next button to begin.

This survey was developed through a project funded by the Michigan Office of Highway Safety Planning and the U.S. Department of Transportation.

Q1.2 Which best describes your current role(s) related to child passenger safety? Pick all that apply.

- ☐ Child Passenger Safety Technician (CPST) (1)
- ☐ Child Passenger Safety Technician-Instructor (CPST-I) (2)
- ☐ Senior Checker (3)
- ☐ Tech Proxy (4)
- ☐ Event Coordinator (7)
- ☐ None of the above (5)
- ☐ Other: (please indicate) (6) \_\_\_\_\_

Q1.3 In the past 12 months of your work as a CPST, were you:

- ☐ Volunteering (1)
- ☐ Paid (2)
- ☐ Both of the above (3)

Answer If IN the past 12 months of your work as a CPST, were you: Paid Is Selected Or IN the past 12 months of your work as a CPST, were you: Both of the above Is Selected



Q1.4 When you are working as a paid CPST, is it:

- ☐ As an independent consultant/per diem/contract status (1)
- ☐ Required for my job, more than 50% of my duties (2)
- ☐ Required for my job, 25-50% of my duties (3)
- ☐ Required for my job, less than 25% of my duties (4)
- ☐ Not required, but helpful for my job (5)
- ☐ Other: (please indicate) (6) \_\_\_\_\_

If As an independent consultan... Is Displayed, Then Skip To End of Block

Answer If In your efforts as a Child Passenger Safety Technician (CPST), which best describes your work  
Volunteer Is Selected

Q1.5 When you are volunteering as a CPST, is it:

- ☐ Helpful for my paid job (1)
- ☐ Not helpful for my paid job (2)
- ☐ Not applicable, I am not currently employed (3)

Q2.1 Have you ever distributed free car seats from the Michigan Office of Highway Safety Planning (OHSP)?

- ☐ Yes (1)
- ☐ No (2)
- ☐ Not sure (3)

Q2.2 As you are answering the next few questions, please keep the following definitions in mind: Car Seat Check Event – an event during which the primary function is to check car seats. Education sessions/lectures without car seat checks should NOT be included. Examples: Seat Check Saturday = 1 event Annual health and safety fair with car seat checks = 1 event Inspection or Fitting Station – specific locations where car seat checks are routinely scheduled, either by appointment or drop-in. Please count each location/time frame once. Do not count the number of times they hold checks in a given week or month. Examples: Station 6, every 2nd Tuesday of the month, from 3-5 pm = 1 station County Health Department, Monday-Friday, from 2-4 pm = 1 station

Q2.3 In the past 12 months, did you coordinate a car seat check event(s) or inspection/fitting station(s)?

- ☐ Yes (1)
- ☐ No (2)

If No Is Selected, Then Skip To End of Block

Q2.4 In the past 12 months, how many did you coordinate?

	None in the past 12 months (1)	1-2 (2)	3-5 (3)	6-10 (4)	More than 10 (5)
Car Seat Check EVENTS (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspection or Fitting STATIONS (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q2.5 Have you ever asked participants to evaluate their car seat check experience? (examples: paper/email survey or follow-up phone call)

- ☐ Yes (1)
- ☐ No (2)

Q3.1 For the next set of questions, please think about the past 12 months.

Q3.2 In the past 12 months, how often did you check car seats at events and/or stations?

- ☐ Daily (1)
- ☐ Weekly (2)
- ☐ Monthly (3)
- ☐ Quarterly (4)
- ☐ Twice a year (5)
- ☐ Once a year or less (6)

Q3.3 In the past 12 months, about how many car seats, on average, did you personally check? NOTE: Do not count seats you “checked” or “signed-off” as a Senior Checker.

- ☐ 1-2 per month (1)
- ☐ 3-5 per month (2)
- ☐ 6-10 per month (3)
- ☐ 11-20 per month (4)
- ☐ 21-30 per month (5)
- ☐ More than 30 car seats per month (6)

Q3.4 In the past 12 months, about how much time, on average, did you spend checking seats? NOTE: Include hours spent as a Senior Checker. But do not count hours planning events, doing presentations or paperwork, or scheduling appointments.

- ☐ Less than 1 hour (1)
- ☐ 1-5 hours (2)
- ☐ 6-10 hours (3)
- ☐ 11-20 hours (4)
- ☐ 21-30 hours (5)
- ☐ 31-50 hours (6)
- ☐ More than 50 hours per month (7)

Q3.5 In the past 12 months, which types of car seats did you typically check? Pick all that apply.

- ☐ Rear-facing only car seats (1)
- ☐ Rear-facing convertible car seats (2)
- ☐ Forward-facing harnesses (including convertible car seats) (3)
- ☐ Booster seats (4)
- ☐ Kids in vehicle seat belts (5)

Q3.6 Of the seats that you selected (in Q3.5 above), estimate the percent of each type of car seat you typically check: Please adjust percentages so the total is 100%.

Q3.7 In the past 12 months, where have you checked car seats? Pick all that apply.

- ☐ Fitting/inspection stations (1)
- ☐ Car seat check events (2)
- ☐ Clients' chosen locations (3)
- ☐ Homes of family/friends (4)
- ☐ Other: (please describe) (5) \_\_\_\_\_

Q3.8 Of the locations you selected, estimate the percent of time you spent at each location: Please adjust percentages so the total is 100%.

Q3.9 In the past 12 months, WHERE have you checked car seats? Indicate if the check was at an event, fitting station or both.

	Seat check EVENTS(s) (1)	Fitting STATION(s) (2)
Healthcare facility/hospital (1)	<input type="checkbox"/>	<input type="checkbox"/>
Fire/Police Department (2)	<input type="checkbox"/>	<input type="checkbox"/>
County Public Health Office (3)	<input type="checkbox"/>	<input type="checkbox"/>
Car seat retailer (example: Babies R Us) (4)	<input type="checkbox"/>	<input type="checkbox"/>
Insurance office (5)	<input type="checkbox"/>	<input type="checkbox"/>
Faith-based organization (6)	<input type="checkbox"/>	<input type="checkbox"/>
Childcare center/school (7)	<input type="checkbox"/>	<input type="checkbox"/>
Car dealership (8)	<input type="checkbox"/>	<input type="checkbox"/>
Mall (9)	<input type="checkbox"/>	<input type="checkbox"/>
Park (10)	<input type="checkbox"/>	<input type="checkbox"/>

Q3.10 In the past 12 months, HOW did people find out about the car seat checks? Indicate if these finds were related to an event, fitting station or both.

	Seat check EVENT(s) (1)	Fitting STATION(s) (2)
Signs posted to direct people to the event or station (1)	<input type="checkbox"/>	<input type="checkbox"/>
Website or social media (2)	<input type="checkbox"/>	<input type="checkbox"/>
News media (newspaper, radio, television) (3)	<input type="checkbox"/>	<input type="checkbox"/>
Referred during a presentation or class (4)	<input type="checkbox"/>	<input type="checkbox"/>
Referred by a doctor or nurse (5)	<input type="checkbox"/>	<input type="checkbox"/>
Referred by a social service agency or health department (6)	<input type="checkbox"/>	<input type="checkbox"/>
Referred by law enforcement, court or judge (7)	<input type="checkbox"/>	<input type="checkbox"/>
Word of mouth (8)	<input type="checkbox"/>	<input type="checkbox"/>
I'm not sure (9)	<input type="checkbox"/>	<input type="checkbox"/>

Q3.11 Please select ALL of the region(s) in which you checked car seats in the past 12 months.

- ☐ 1. Upper Peninsula (Alger, Baraga, Chippewa, Delta, Dickinson, Gogebic, Houghton, Iron, Keweenaw, Luce, Mackinac, Marquette, Menominee, Ontonagon, Schoolcraft) (4)
- ☐ 2. Northwest (Antrim, Benzie, Charlevoix, Emmet, Grand Traverse, Kalkaska, Leelanau, Manistee, Missaukee, Wexford) (6)
- ☐ 3. Northeast (Alcona, Alpena, Cheboygan, Crawford, Iosco, Montmorency, Ogemaw, Oscoda, Otsego, Presque Isle, Roscommon) (3)
- ☐ 4. West (Allegan, Barry, Ionia, Kent, Lake, Mason, Mecosta, Montcalm, Muskegon, Newaygo, Oceana, Osceola, Ottawa) (5)
- ☐ 5. East Central (Arenac, Bay, Clare, Gladwin, Gratiot, Isabella, Midland, Saginaw) (9)
- ☐ 6. East (Genesee, Huron, Lapeer, Sanilac, Shiawassee, St. Clair, Tuscola) (10)
- ☐ 7. South Central (Clinton, Eaton, Ingham) (1)
- ☐ 8. Southwest (Berrien, Branch, Cass, Calhoun, Kalamazoo, St. Joseph, Van Buren) (8)
- ☐ 9. Southeast (Hillsdale, Jackson, Lenawee, Livingston, Monroe, Washtenaw) (7)
- ☐ 10. Metro Detroit (Macomb, Oakland, Wayne) (2)

Answer If    Please selected the region(s) in which you did a car seat check in the past 12 months.  Select all that apply 1. Upper Peninsula (Alger, Baraga, Chippewa, Delta, Dickinson, Gogebic, Houghton, Iron, Keweenaw, Luce, Mackinac, Marquette, Menominee, Ontonagon, Schoolcraft) Is Selected

Q3.12 Please select ALL of the counties, within the Upper Peninsula Region, where you checked a car seat in the past 12 months. NOTE: Count both events and fitting stations.

- ☐ Alger (1)
- ☐ Baraga (2)
- ☐ Chippewa (3)
- ☐ Delta (4)
- ☐ Dickinson (5)
- ☐ Gogebic (6)
- ☐ Houghton (7)
- ☐ Iron (8)
- ☐ Keweenaw (9)
- ☐ Luce (10)
- ☐ Mackinac (11)
- ☐ Marquette (16)
- ☐ Menominee (12)
- ☐ Ontonagon (13)
- ☐ Schoolcraft (14)
- ☐ Unsure (please indicate city/cities, if known) (15) \_\_\_\_\_

Answer If    Please selected the region(s) in which you did a car seat check in the past 12 months.  Select all that apply 2. Northwest (Emmet, Antrim, Kalkaska, Charlevoix, Leelanau, Benzie, Manistee, Wexford, Missaukee, Grand Traverse) Is Selected

Q3.13 Please select ALL of the counties, within the Northwest Region, where you checked a car seat in the past 12 months. NOTE: Count both events and fitting stations.

- ☐ Antrim (2)
- ☐ Benzie (6)
- ☐ Charlevoix (4)
- ☐ Emmet (1)
- ☐ Grand Traverse (10)
- ☐ Kalkaska (3)
- ☐ Leelanau (5)
- ☐ Manistee (7)
- ☐ Missaukee (9)
- ☐ Wexford (8)
- ☐ Unsure (please indicate city/cities, if known) (16) \_\_\_\_\_

Answer If    Please selected the region(s) in which you did a car seat check in the past 12 months.  Select all that apply 3. Northeast (Cheboygan, Presque Isle, Alpena, Alcona, Iosco, Ogemaw, Roscommon, Crawford, Otsego, Montmorency, Oscoda) Is Selected

Q3.14 Please select ALL of the counties, within the Northeast Region, where you checked a car seat in the past 12 months. NOTE: Count both events and fitting stations.

- ☐ Alcona (4)
- ☐ Alpena (3)
- ☐ Cheboygan (1)
- ☐ Crawford (8)
- ☐ Iosco (5)
- ☐ Montmorency (10)
- ☐ Ogemaw (6)
- ☐ Oscoda (11)
- ☐ Otsego (9)
- ☐ Presque Isle (2)
- ☐ Roscommon (7)
- ☐ Unsure (please indicate city/cities, if known) (15) \_\_\_\_\_

Answer If    Please selected the region(s) in which you did a car seat check in the past 12 months.  Select all that apply 4. West (Allegan, Barry, Cass, Kalamazoo, Kent, Mecosta, Muskegon, Newaygo, Oceana, Ottawa, St. Joseph, Van Buren) Is Selected

Q3.15 Please select ALL of the counties, within the West Region, where you checked a car seat in the past 12 months. NOTE: Count both events and fitting stations.

- ☐ Allegan (1)
- ☐ Barry (2)
- ☐ Ionia (4)
- ☐ Kent (6)
- ☐ Lake (5)
- ☐ Mason (3)
- ☐ Mecosta (7)
- ☐ Montcalm (15)
- ☐ Muskegon (8)
- ☐ Newaygo (9)
- ☐ Oceana (10)
- ☐ Osceola (12)
- ☐ Unsure (please indicate city/cities, if known) (14) \_\_\_\_\_

Answer If    Please selected the region(s) in which you did a car seat check in the past 12 months.&nbsp; Select all that apply 5. East Central (Clare, Gladwin, Arenac, Bay, Midland, Isabella, Saginaw, Gratiot) Is Selected

Q3.16 Please select ALL of the counties, within the East Central Region, where you checked a car seat in the past 12 months. NOTE: Count both events and fitting stations.

- ☐ Arenac (3)
- ☐ Bay (4)
- ☐ Clare (1)
- ☐ Gladwin (2)
- ☐ Gratiot (8)
- ☐ Isabella (6)
- ☐ Midland (5)
- ☐ Saginaw (7)
- ☐ Unsure (please indicate city/cities, if known) (12) \_\_\_\_\_

Answer If    Please selected the region(s) in which you did a car seat check in the past 12 months.&nbsp; Select all that apply 6. East (Huron, Tuscola, Genesee, Shiawassee, Lapeer, St. Clair, Sanilac) Is Selected

Q3.17 Please select ALL of the counties, within the East Region, where you checked a car seat in the past 12 months. NOTE: Count both events and fitting stations.

- ☐ Genesee (3)
- ☐ Huron (1)
- ☐ Lapeer (5)
- ☐ Sanilac (7)
- ☐ Shiawassee (4)
- ☐ St. Clair (6)
- ☐ Tuscola (2)
- ☐ Unsure (please indicate city/cities, if known) (9) \_\_\_\_\_

Answer If    Please selected the region(s) in which you did a car seat check in the past 12 months.&nbsp; Select all that apply 7. South Central (Clinton, Eaton, Ingham) Is Selected

Q3.18 Please select ALL of the counties, within the South Central Region, where you checked a car seat in the past 12 months. NOTE: Count both events and fitting stations.

- ☐ Clinton (1)
- ☐ Eaton (2)
- ☐ Ingham (3)
- ☐ Unsure (please indicate city/cities, if known) (4) \_\_\_\_\_

Answer If    Please selected the region(s) in which you did a car seat check in the past 12 months.  Select all that apply 8. Southwest (Berrien, Branch, Cass, Calhoun, Kalamazoo, St. Joseph, Van Buren) Is Selected

Q3.19 Please select ALL of the counties, within the Southwest Region, where you checked a car seat in the past 12 months. NOTE: Count both events and fitting stations.

- ☐ Berrien (2)
- ☐ Branch (1)
- ☐ Cass (3)
- ☐ Calhoun (4)
- ☐ Kalamazoo (5)
- ☐ St. Joseph (6)
- ☐ Van Buren (7)
- ☐ Unsure (please indicate city/cities, if known) (8) \_\_\_\_\_

Answer If    Please selected the region(s) in which you did a car seat check in the past 12 months.  Select all that apply 9. Southeast (Livingston, Washtenaw, Jackson, Hillsdale, Lenawee, Monroe) Is Selected

Q3.20 Please select ALL of the counties, within the Southeast Region, where you checked a car seat in the past 12 months. NOTE: Count both events and fitting stations.

- ☐ Hillsdale (4)
- ☐ Jackson (3)
- ☐ Lenawee (5)
- ☐ Livingston (1)
- ☐ Monroe (6)
- ☐ Washtenaw (2)
- ☐ Unsure (please indicate city/cities, if known) (8) \_\_\_\_\_

Answer If    Please selected the region(s) in which you did a car seat check in the past 12 months.  Select all that apply 10. Metro Detroit (Macomb, Oakland, Wayne) Is Selected

Q3.21 Please select ALL of the counties, within the Metro Detroit Region, where you checked a car seat in the past 12 months. NOTE: Count both events and fitting stations.

- ☐ Macomb (1)
- ☐ Oakland (2)
- ☐ Wayne (3)
- ☐ Unsure (please indicate city/cities, if known) (4) \_\_\_\_\_



Q3.22 Some factors that might affect your choice to work at a car seat check are listed below. For each item, mark how much each factor applies to YOU.

	Not at all (1)	A little (2)	Some (3)	Quite a bit (4)	Very much (5)	Not Applicable (6)
My employer decides what seat checks I can do (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My employer decides how much time I spend on seat checks (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Time or day of event (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Distance to a location (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appointments vs. drop-ins (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Free food (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Payment or giveaways for doing the checks (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Indoors or outdoors (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Perceived need for education in a certain area or for a certain population (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4.1 For the next set of questions, we want to know more about you and your experiences working in the field of child passenger safety.

Q4.2 People become CPSTs for many different reasons. From the choices below, please mark each reason that relates to why you became a CPST. If there is a reason that is not on the list, you can type in your own reason(s) when you check "other".

- ☐ Job requirement (1)
- ☐ Eligibility for overtime pay or special detail (7)
- ☐ Natural fit/enhancement to my job (2)
- ☐ Recognized gap in resources in my community (3)
- ☐ Personal reasons (e.g. keep my own children safe, learn a new skill, help my community, passion for kids) (4)
- ☐ Know someone affected by a crash (5)
- ☐ Other: (please describe your reason for becoming a CPST) (6) \_\_\_\_\_

Q4.3 When did you first take the class to become a Certified Child Passenger Safety Technician (CPST)?

- ☐ 1997 (1)
- ☐ 1998 (2)
- ☐ 1999 (3)
- ☐ 2000 (4)
- ☐ 2001 (5)
- ☐ 2002 (6)
- ☐ 2003 (7)
- ☐ 2004 (8)
- ☐ 2005 (9)
- ☐ 2006 (10)
- ☐ 2007 (11)
- ☐ 2008 (12)
- ☐ 2009 (13)
- ☐ 2010 (14)
- ☐ 2011 (15)
- ☐ 2012 (16)
- ☐ 2013 (17)
- ☐ 2014 (18)
- ☐ 2015 (19)

Q4.4 Are you a currently certified Child Passenger Safety Technician or Instructor?

- ☐ Yes (1)
- ☐ No (2)

Q4.5 Did you ever have to retake training (either the whole course or the refresher course) because your certification expired?

- ☐ Yes (1)
- ☐ No (2)
- ☐ I have not needed to recertify yet (3)

Answer If Are you a currently certified Child Passenger Safety Technician or Instructor? Yes Is Selected  
And Did you ever have to retake training (either the whole course or the refresher course)  
because your certification expired? I have not needed to recertify yet Is Not Selected

Q4.6 Please mark why you have maintained your certification. Pick all that apply.

- ☐ Job requirement (1)
- ☐ Eligibility for overtime pay or special detail (7)
- ☐ Natural fit/enhancement to my job (2)
- ☐ Recognized gap in resources in my community (3)
- ☐ Personal reasons (examples: keep my own children safe, learn a new skill, help my community, passion for kids) (4)
- ☐ I do not plan to re-certify (5)
- ☐ Other: (please indicate) (6) \_\_\_\_\_

Answer If Are you a currently certified Child Passenger Safety Technician or Instructor? Yes Is Selected  
And Did you ever have to retake training (either the whole course or the refresher course)  
because your certification expired? I have not needed to recertify yet Is Selected

Q4.7 Do you plan to maintain your certification?

- ☐ Yes (1)
- ☐ No (2)
- ☐ Not sure (3)

Answer If Do you plan to maintain your certification? Yes Is Selected

Q4.8 Please mark why you plan to maintain your certification. Pick all that apply.

- ☐ Job requirement (1)
- ☐ Eligibility for overtime pay or special detail (6)
- ☐ Natural fit/enhancement to my job (2)
- ☐ Recognized gap in resources in my community (3)
- ☐ Personal reasons (e.g. keep my own children safe, learn a new skill, help my community, passion for kids) (4)
- ☐ Other: (please indicate) (5) \_\_\_\_\_

Answer If Did you ever have to retake training (either the whole course or the refresher course) because your certification expired? I have not needed to recertify yet Is Not Selected

Q4.9 In your most recent re-certification cycle, how did you earn Continuing Education Units (CEU's)? Pick all that apply.

- ☐ I have not received any CEU's in the past year (1)
- ☐ KIM (Kidz in Motion) Conference (2)
- ☐ Lifesavers Conference (3)
- ☐ Safe Kids Worldwide Conference (8)
- ☐ Regional, state or local CEU event (9)
- ☐ Subscriptions and Newsletters (4)
- ☐ Online (5)
- ☐ CEU course in-person (6)
- ☐ Other: (please indicate) (7) \_\_\_\_\_

Q4.10 Many CPSTs in Michigan do not recertify. Indicate the impact each reason below has on their decision to not recertify.

	Not at all (1)	A little (2)	Some (3)	Quite a bit (4)	Very much (5)
Re-certification fees are too expensive. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is too hard to get seat sign offs with an instructor. (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is too far to drive to get seat sign offs with an instructor. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is hard to earn CEU's. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It takes more work than expected to recertify. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People lose motivation to stay certified. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The process is confusing. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No longer require for a job. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Getting liability coverage is a problem. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Change in job duties. (21)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other reason: (please indicate) (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q5.1 Please mark if you have taken or would like to take any of the specialized courses listed below.

	Have taken (1)	Would like to take (2)
CPS on School Buses (1)	<input type="checkbox"/>	<input type="checkbox"/>
Children with Special Healthcare Needs (2)	<input type="checkbox"/>	<input type="checkbox"/>
Safe Transportation of Children in Ambulances (3)	<input type="checkbox"/>	<input type="checkbox"/>
None (4)	<input type="checkbox"/>	<input type="checkbox"/>
Other (5)	<input type="checkbox"/>	<input type="checkbox"/>

Answer If There are specialized classes for CPSTs to learn extra skills. Please indicate if you have taken... Other - Have taken Is Selected Or There are specialized classes for CPSTs to learn extra skills. Please indicate if you have taken... Other - Would like to take Is Selected

Q5.2 Please describe the other specialized classes you have taken or would like to take to learn extra skills.

Q6.1 Do you work with a Safe Kids Coalition?

- ☐ Yes (1)
- ☐ No (2)
- ☐ I don't know (3)

Answer If Do you work with, or are you affiliated with, a Safe Kids Coalition? Yes Is Selected

Q6.2 Which Safe Kids Coalition(s) do you work with? Pick all that apply.

- ☐ Branch-Hillsdale-St. Joseph Counties (1)
- ☐ Capital Area (2)
- ☐ Greater Flint (3)
- ☐ Greater Grand Rapids (4)
- ☐ Greater Thumb and Saginaw Area (5)
- ☐ Huron Valley (6)
- ☐ Kalamazoo County (7)
- ☐ Macomb County (8)
- ☐ Metro Detroit (9)
- ☐ North Shore (10)
- ☐ Oakland County (11)
- ☐ West Michigan (12)
- ☐ Safe Kids coalition outside of Michigan (14)
- ☐ I don't know (13)

Q6.3 Which best describes your main job?

- ☐ Fire/Rescue/EMS (1)
- ☐ Law Enforcement (2)
- ☐ Child Passenger Safety Technician (3)
- ☐ Child Passenger Safety Technician-Instructor (15)
- ☐ Healthcare Practitioner or Technician (e.g. physician, nurse, physical/occupational therapist) (4)
- ☐ Community and Social Service (e.g. social worker, clergy, health educator, child protective services) (5)
- ☐ Education (e.g. teacher, teaching assistant) (6)
- ☐ Transportation (e.g. traffic safety planning, research, automotive engineer, crash reconstruction) (7)
- ☐ Stay at home parent/grand parent (8)
- ☐ Child Care (e.g. child care worker, nanny) (9)
- ☐ Communications (e.g. writer, public relations, advertising) (10)
- ☐ Office/Administrative Support (e.g. receptionist, administrative assistant) (11)
- ☐ Business Operations (e.g. insurance agent/claims, retail, car seat manufacturer rep) (12)
- ☐ Retired (13)
- ☐ Other: (please indicate) (14) \_\_\_\_\_

Q6.4 Please enter your HOME zip code:

Q6.5 Please enter your WORK zip code:

Q6.6 What is your age?

- ☐ 18-24 years (1)
- ☐ 25-34 years (2)
- ☐ 35-44 years (3)
- ☐ 45-54 years (4)
- ☐ 55-64 years (5)
- ☐ older than 65 years (6)

Q6.7 What is your gender identity?

- ☐ Male (1)
- ☐ Female (2)
- ☐ Other (3)

Q6.8 Which best describes your race or ethnic background? Pick all that apply.

- ☐ White (1)
- ☐ American Indian/Alaskan Native (2)
- ☐ Black (3)
- ☐ Native Hawaiian/Pacific Island (4)
- ☐ Asian (5)
- ☐ Hispanic/Latino (6)
- ☐ Other: (please indicate) (7) \_\_\_\_\_
- ☐ I prefer not to answer (8)

Q6.9 What languages do you know well enough to use to check a car seat? Pick all that apply.

- ☐ Albanian (12)
- ☐ American Sign Language (ASL) (1)
- ☐ Arabic (2)
- ☐ Chaldean (13)
- ☐ English (3)
- ☐ French (4)
- ☐ German (5)
- ☐ Hmong (14)
- ☐ Korean (6)
- ☐ Polish (7)
- ☐ Spanish (8)
- ☐ Tagalog (9)
- ☐ Vietnamese (10)
- ☐ Other: (please indicate) (11) \_\_\_\_\_

Q6.10 What is the highest level of school you have finished?

- ☐ Some high school (1)
- ☐ High school graduate or GED (2)
- ☐ Some college (3)
- ☐ Trade/technical/vocational training (4)
- ☐ Associate degree (5)
- ☐ Bachelor's degree (6)
- ☐ Master's degree (7)
- ☐ Professional degree (MD, JD) (8)
- ☐ Doctorate degree (Ph.D) (9)

Answer If What is the highest degree or level of education that you have completed? If you are currently enrolled in school please indicate the highest degree you have received.<o:p></o:p> Some high school,

no diploma Is Not Selected And What is the highest degree or level of education that you have completed? If you are currently enrolled in school please indicate the highest degree you have received.<o:p></o:p> High school graduate, diploma or the equivalent Is Not Selected

Q6.11 Please share your area of study. Examples include Paramedic, Early Childhood Development, and Public Health.

Q6.12 To keep your answers to this survey private, you will be re-directed to a new survey for 3 final questions.

### **Michigan CPS Tech Survey.2 – Survey to Develop Contact List for Additional Information**

Q1 Thank you so much for taking the time to complete this survey. We greatly appreciate your time and effort! We have just a few more questions before you finish.

Q2 We are gathering information about the specific location(s) of the car seat events/fitting stations from the past 12 months. Are you a coordinator who is willing to be contacted by our research team?

- ☐ Yes (1)
- ☐ No (2)

Q3 The Michigan Office of Highway Safety Planning (OHSP) has offered to pay for a total of 15 recertification fees among technicians who participate in this survey. Would you like to be entered into the drawing for a chance to have OHSP pay for your next recertification?

- ☐ Yes (1)
- ☐ No, thanks (2)

Q4 IF you selected YES to either of the questions above, please provide your contact information below:

Name (1)  
Email (2)  
Phone (3)

Q5 Your contact information cannot be linked back to your responses to the survey.

Q6 Thank you so much for taking the time to finish our survey and helping to keep kids safe on the roads in Michigan! We look forward to connecting with you soon!



## Appendix C: Full Page Presentation of Maps Included in Report





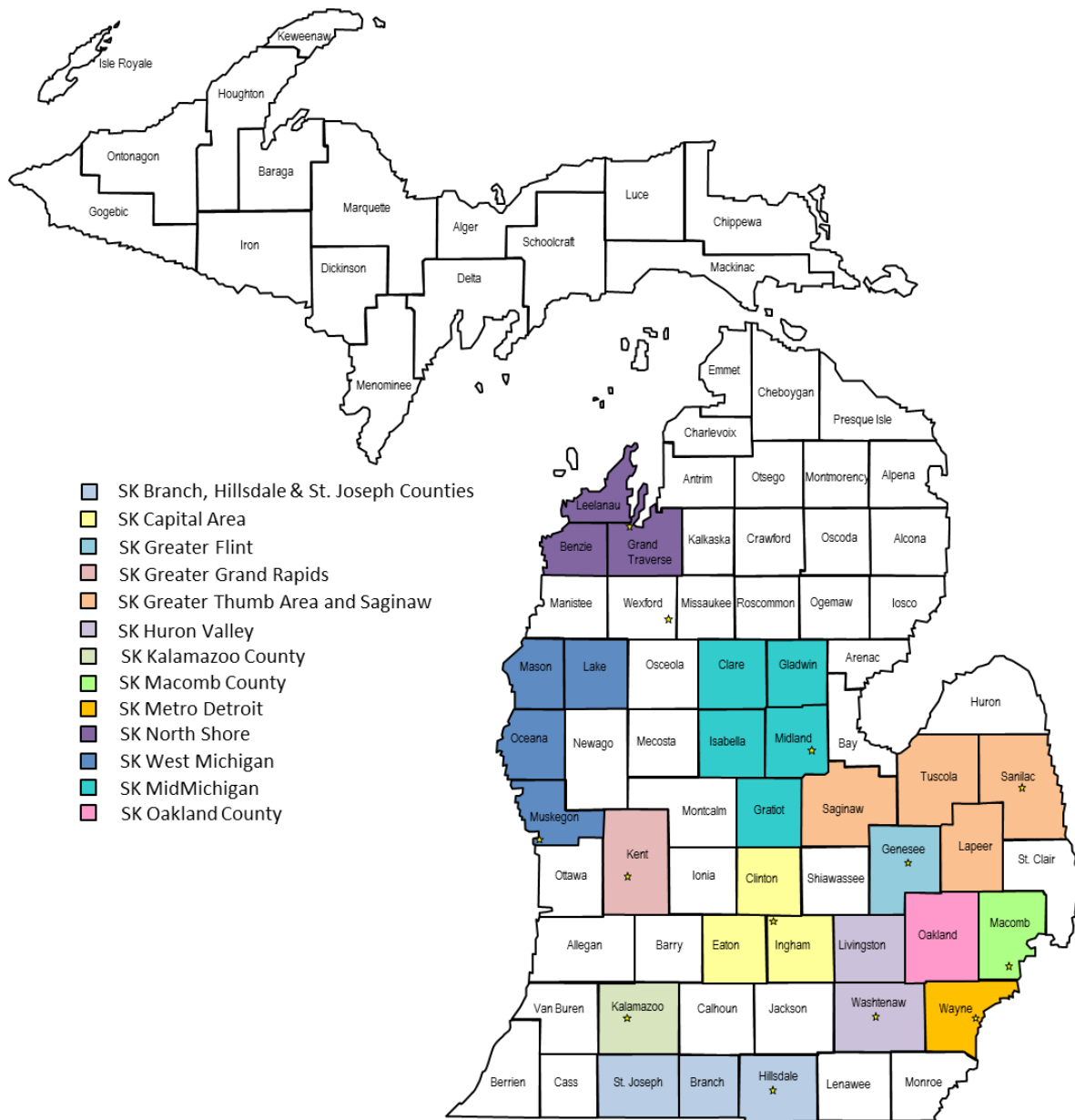
## Regional Traffic Safety Network

- Upper Peninsula: Jamie Dolan**  
906-225-7036  
dolanj@michigan.gov
- Traverse Bay Area: Jamie Dolan**  
906-225-7036  
dolanj@michigan.gov
- Northern Lower: Jamie Dolan**  
906-225-7036  
dolanj@michigan.gov
- Lakeshore: Charlotte Kilvington**  
517-241-2582  
kilvingtonc@michigan.gov
- Chippewa Valley: Chad Teachout (Not Active)**  
517-241-2579  
teachoutc@michigan.gov
- Saginaw Valley: Melody Kindraka**  
517-241-1522  
kindrakam@michigan.gov
- West Michigan: Alicia Sledge**  
517-241-1505  
sledgea@michigan.gov
- Southwest: Alyson Kechkaylo (Not Active)**  
517-241-2546  
kechkayloa@michigan.gov
- South Central: Alyson Kechkaylo (Not Active)**  
517-241-2546  
kechkayloa@michigan.gov
- Capital Area: Linda Feh**  
517-241-2533  
fehlm@michigan.gov
- Huron Valley: Kristin Allen (Not Active)**  
517-241-2486  
allenK14@michigan.gov

- Thumb Area: Vacant (Not Active)**
- St. Clair: Dianne Perukel (Not Active)**  
517-241-2565  
perukeld@michigan.gov
- Macomb County TSAM: Dianne Perukel**  
517-241-2565  
perukeld@michigan.gov
- Wayne County: Dianne Perukel**  
517-241-2565  
perukeld@michigan.gov
- Oakland County/TIA Early Birds: Mike Prince**  
517-241-1512  
princem@michigan.gov

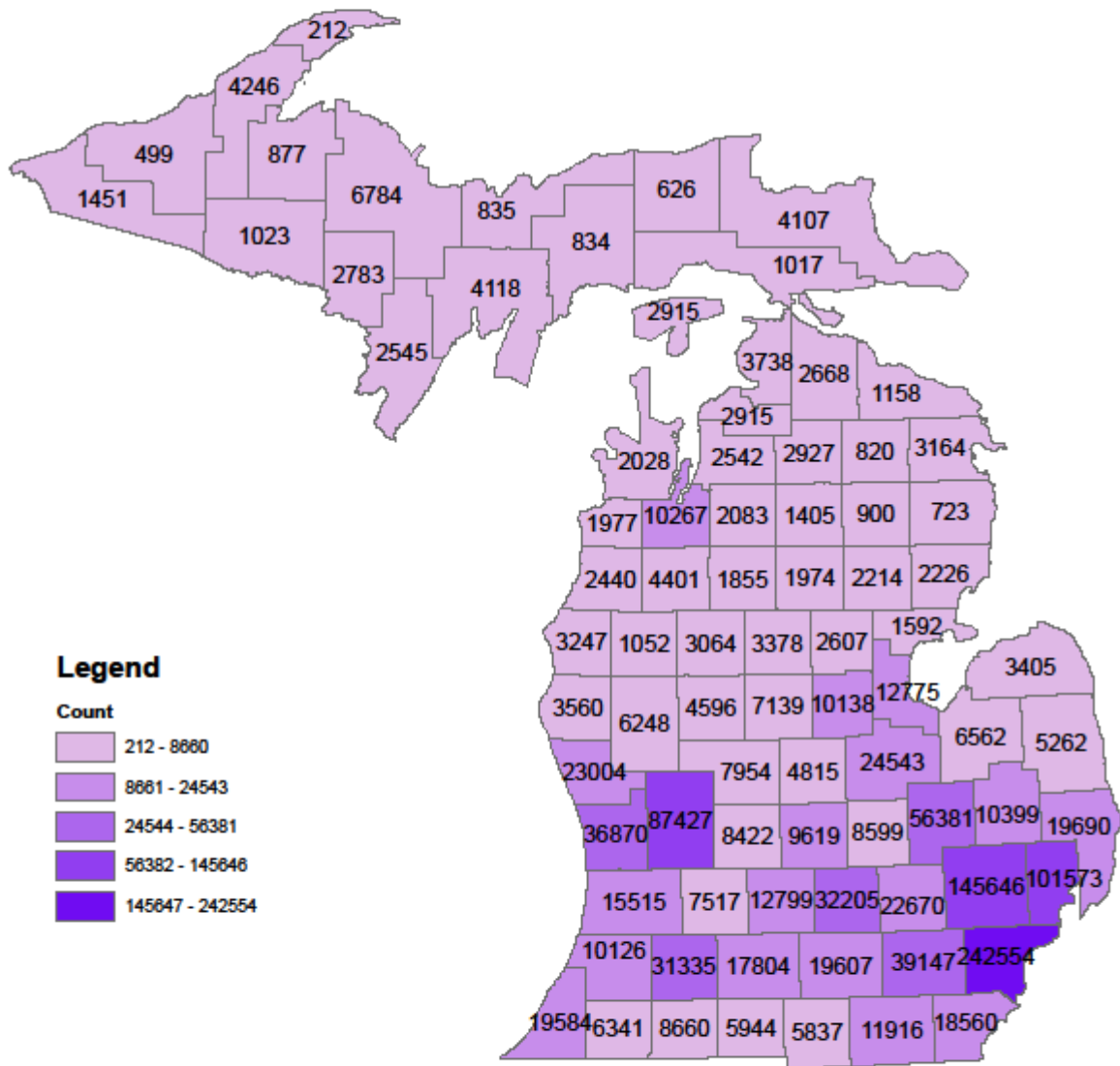


Updated 1-28-2016



Safe Kid Community Coalitions  
Michigan Department of Community Health  
Injury Prevention Section – 9/2014

Figure 4a: Total child population  $\leq 9$  years  
by county  
per 2010 U.S. Census



**Legend**

Proportion

- 0.07 - 0.10
- 0.11
- 0.12
- 0.13
- 0.14 - 0.15

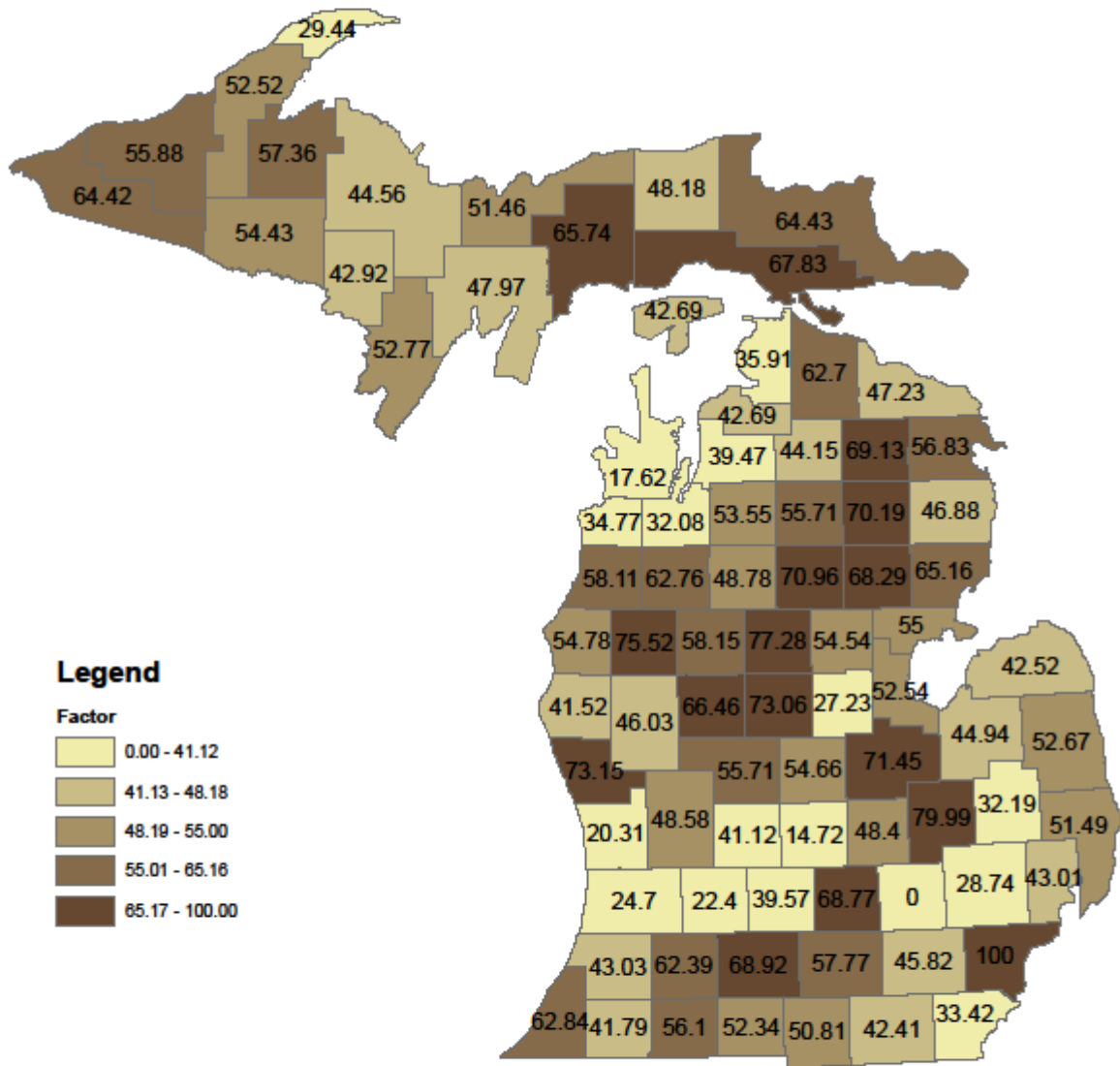
Figure 5a: Proportion of county population that was non-white per 2010 U.S. Census

Figure 5b: Proportion of county population that was Hispanic per 2010 U.S. Census

Figure 5c: Proportion of county population that was non-English speaking per 2010 U.S. Census



Figure 6a: Distribution of poverty  
by county  
based on a scaled poverty factor



[illegible]

**Figure 7: Crashes involving children  $\leq 9$  years who were killed or injured, improperly restrained, or sitting in front per 100,000 average Annual Vehicle Miles Traveled per county, 2010-2014**

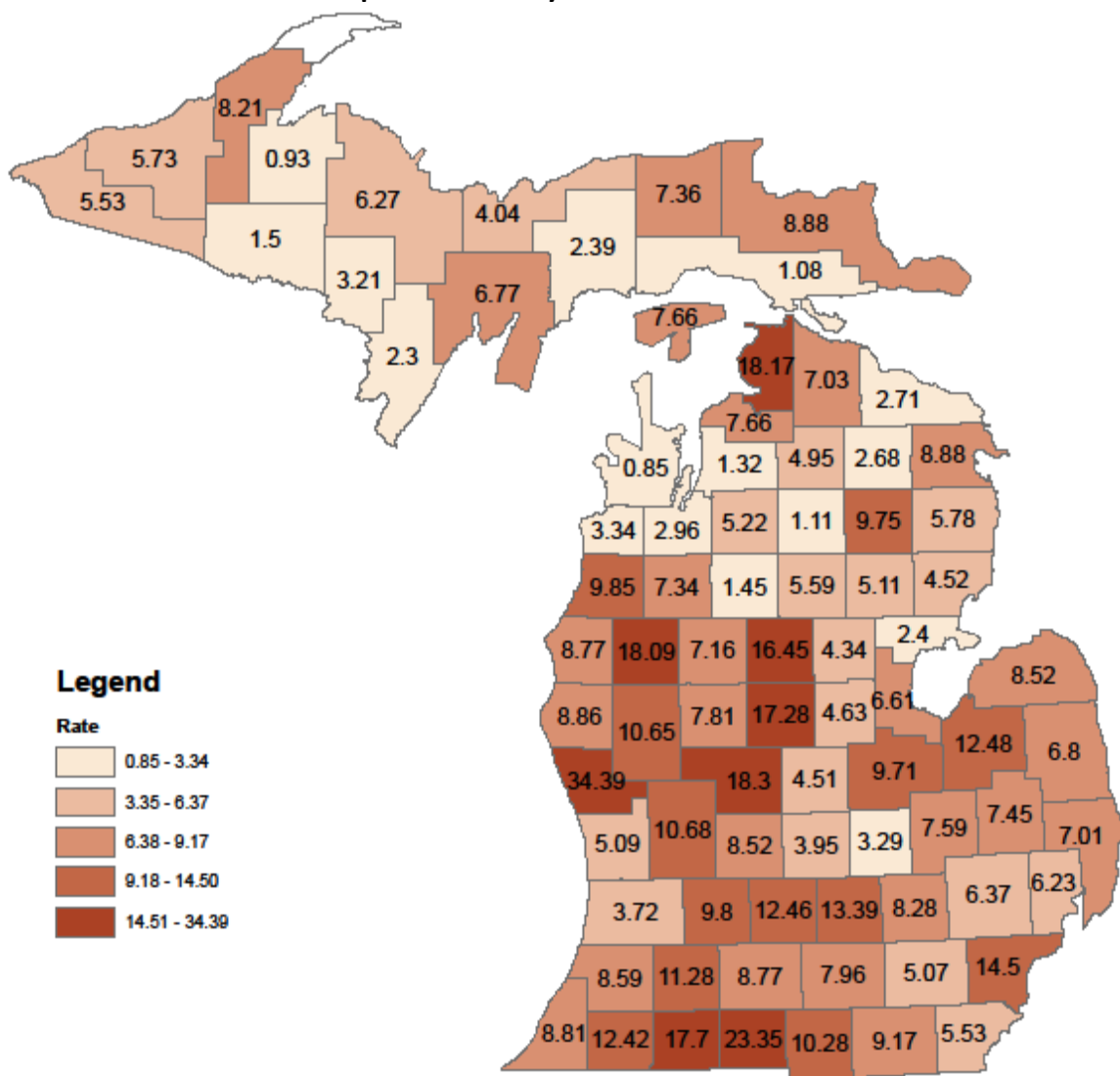


Figure 8a: Distribution of composite risk scores  
by county  
based on Score 1 weighting scheme

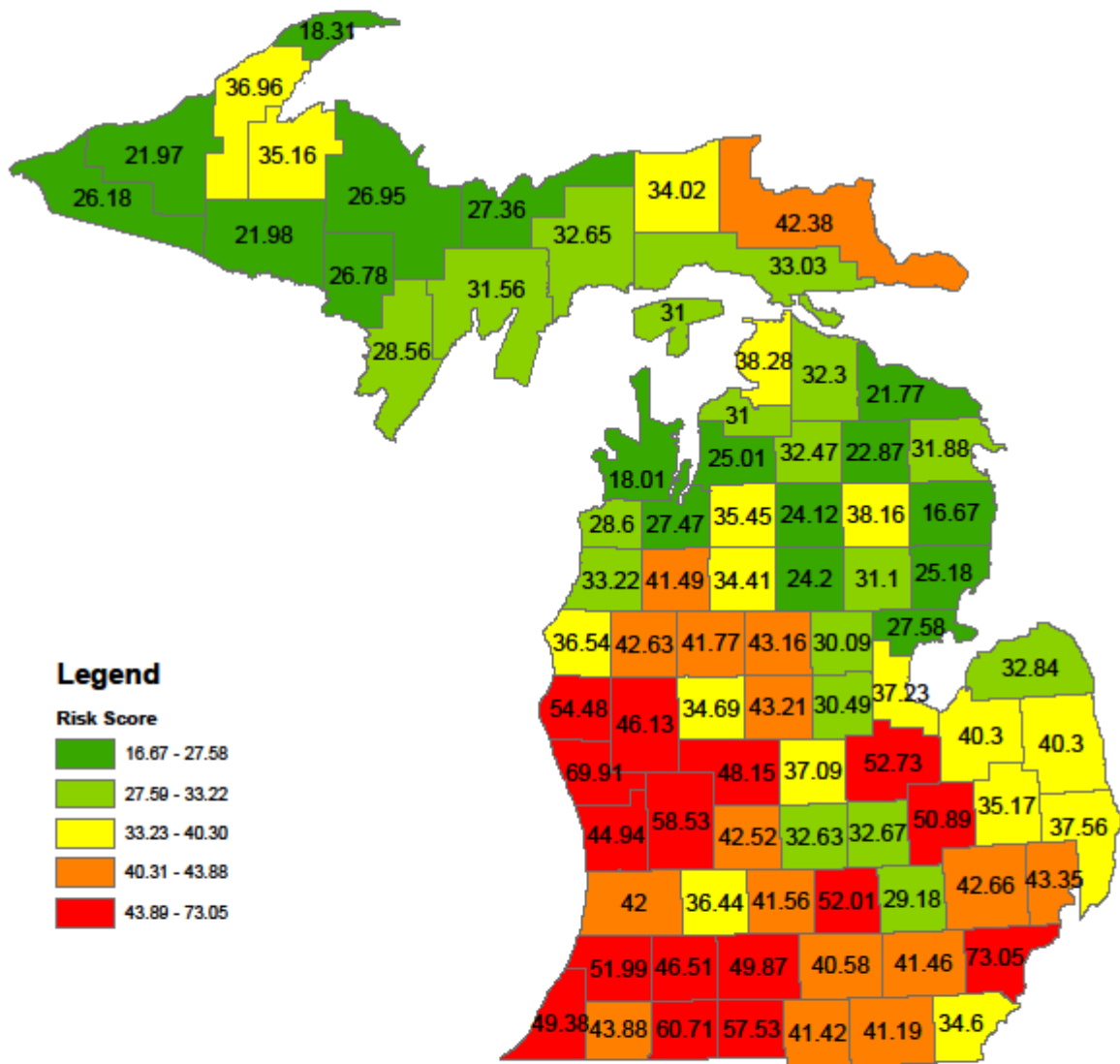


Figure 8b: Distribution of composite risk scores  
by county  
based on Score 5 weighting scheme

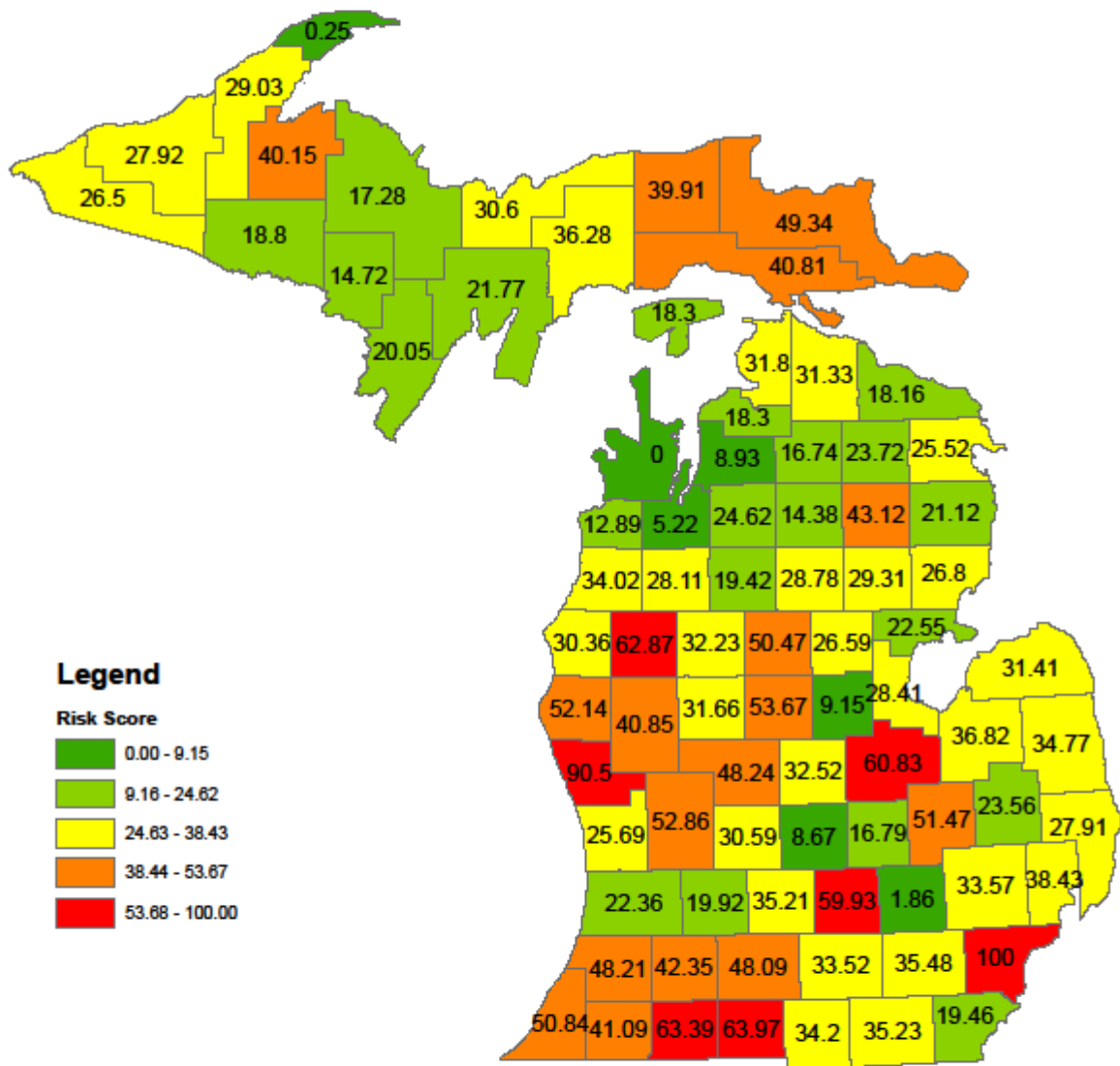


Figure 9: Relative risk by county  
based on Score 5 weighting scheme

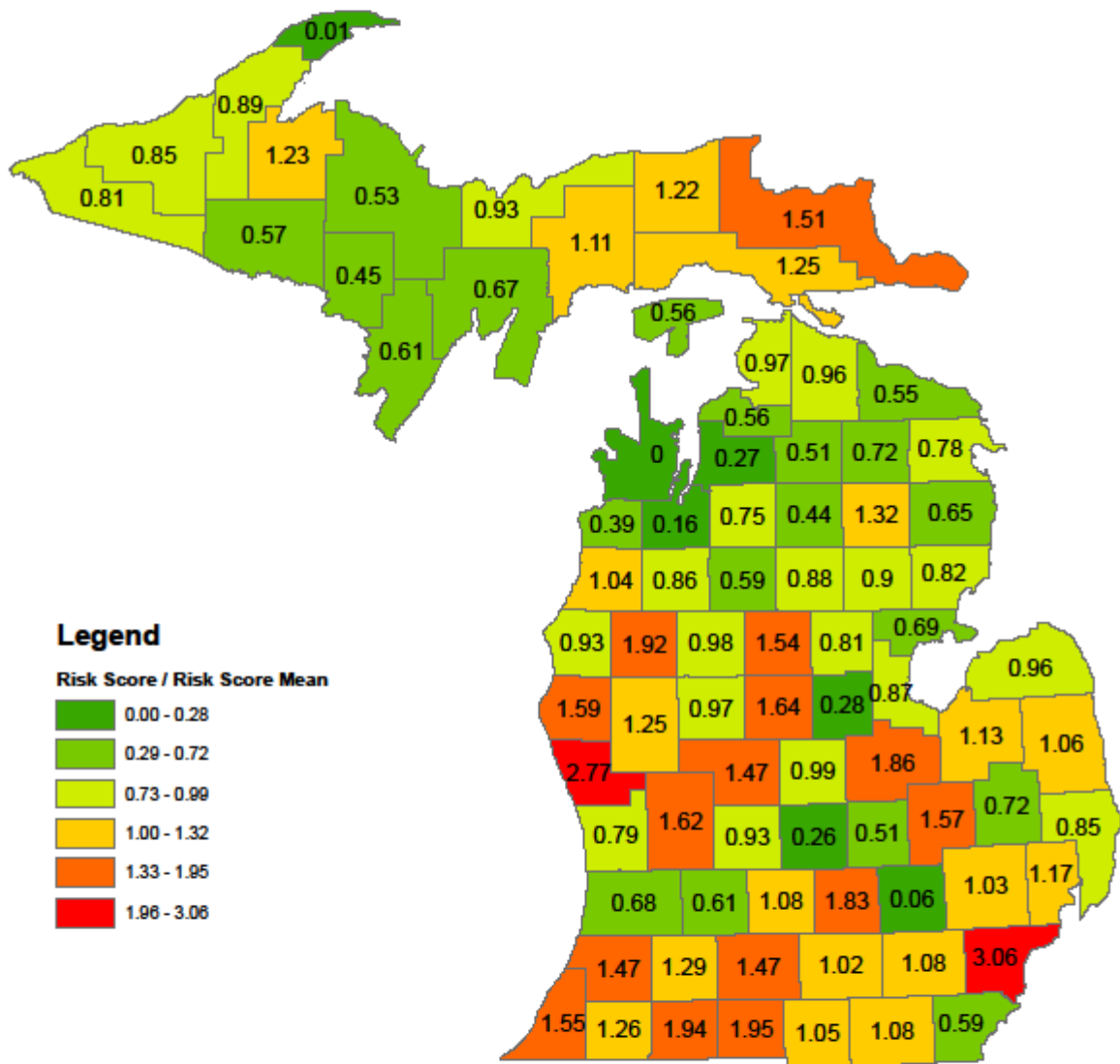
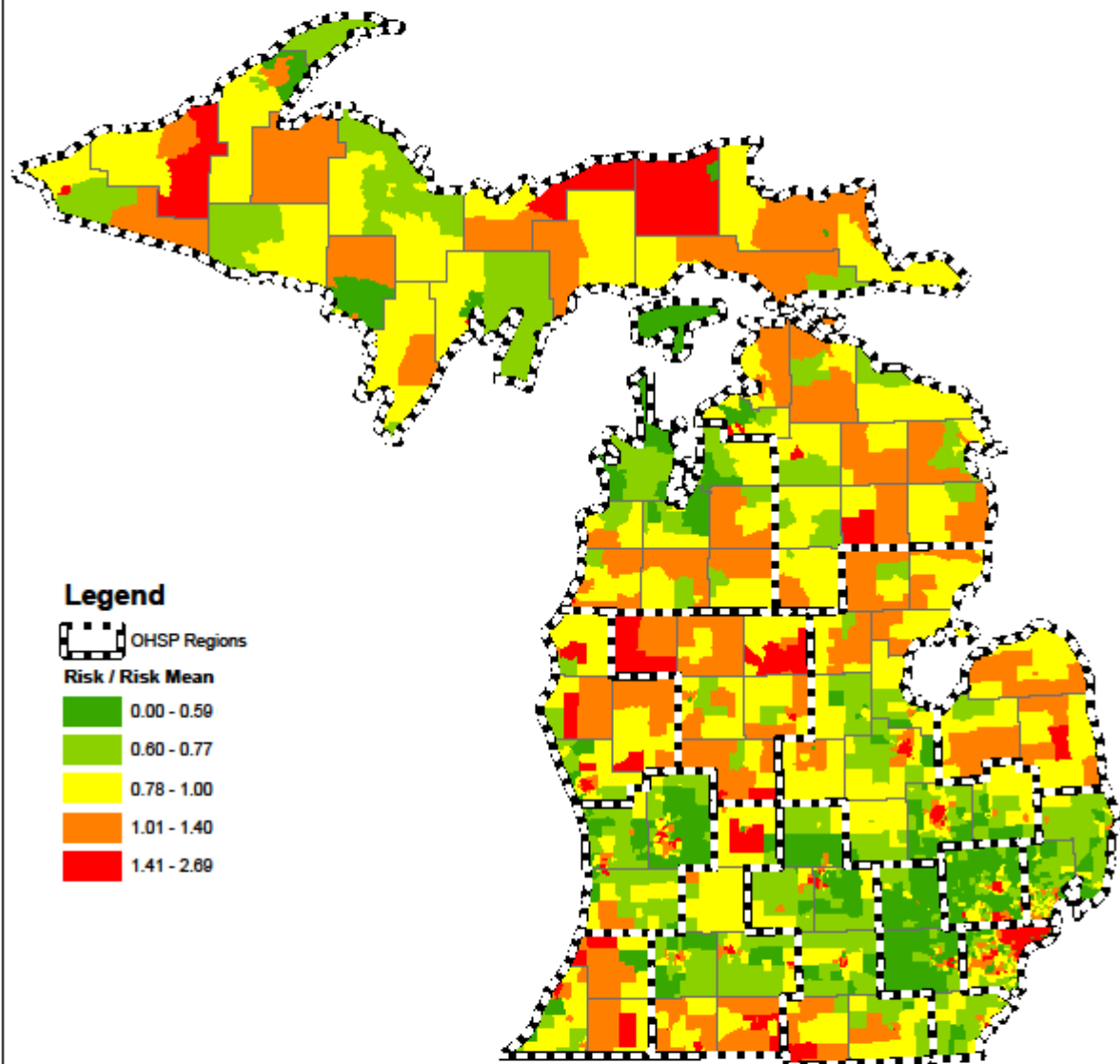
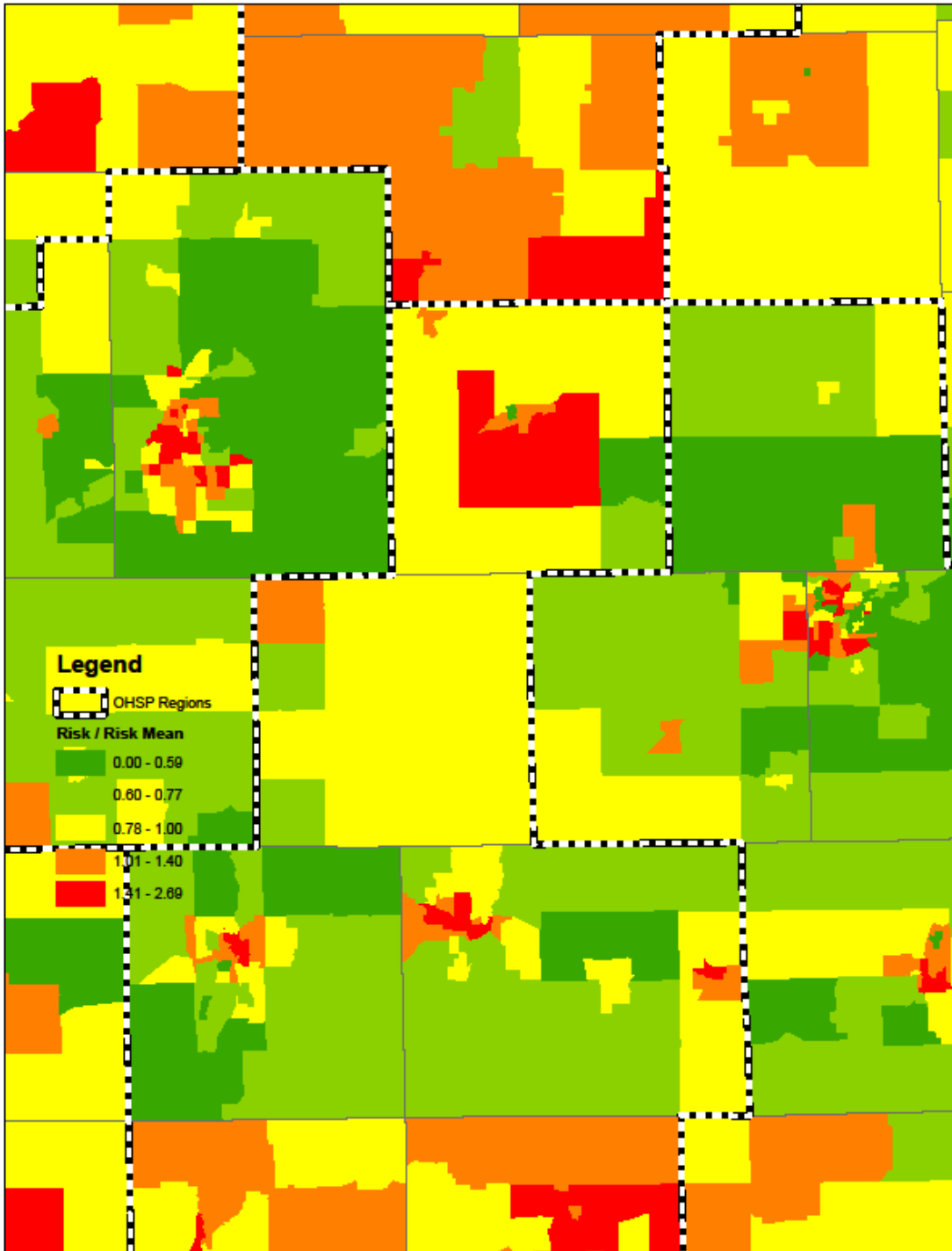


Figure 10: Relative risk by census tract  
based on Score 5 weighting scheme



**Figure 10 Inset for Southwest Michigan**  
**Relative risk by census tract**  
based on Score 5 weighting scheme





**Figure 10 Inset for Southeast Michigan**  
**Relative risk by census tract**  
based on Score 5 weighting scheme

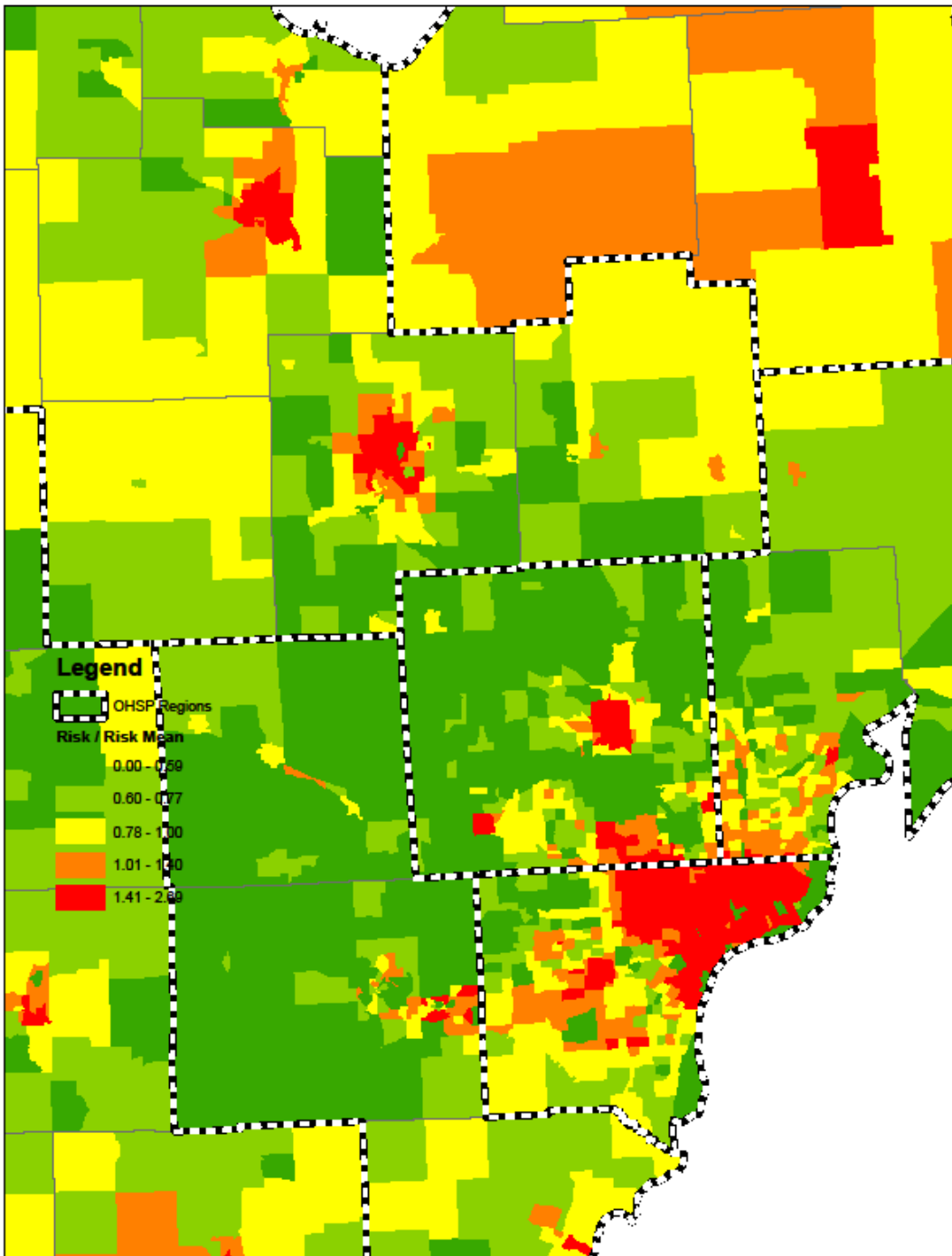


Figure 11a: Child Passenger Safety Technicians (CPSTs)  
per county in 2014  
within OHSP Regions

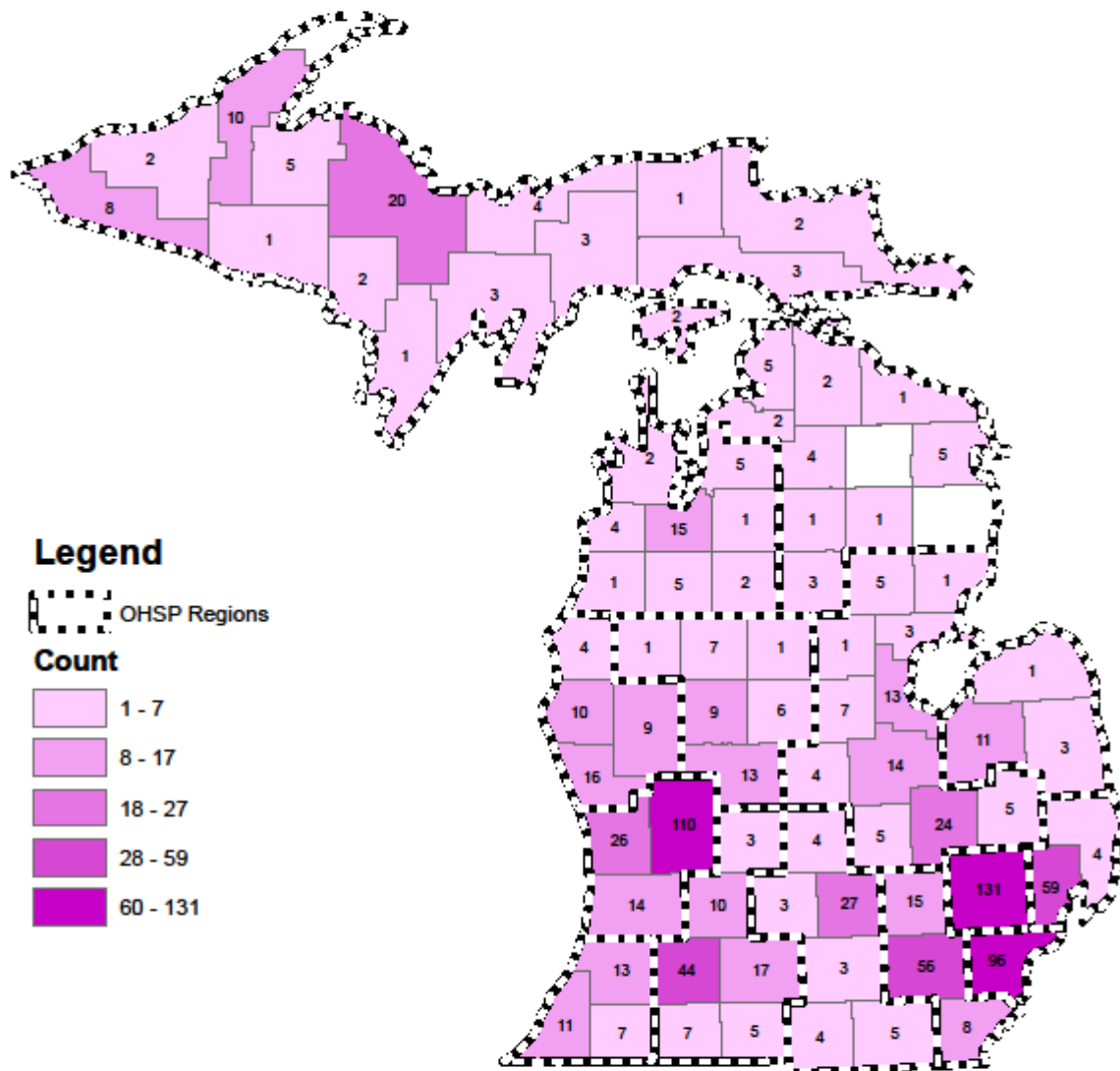


Figure 11b: Child Passenger Safety Technicians (CPSTs)  
per county in 2014  
within Safe Kids Michigan Counties

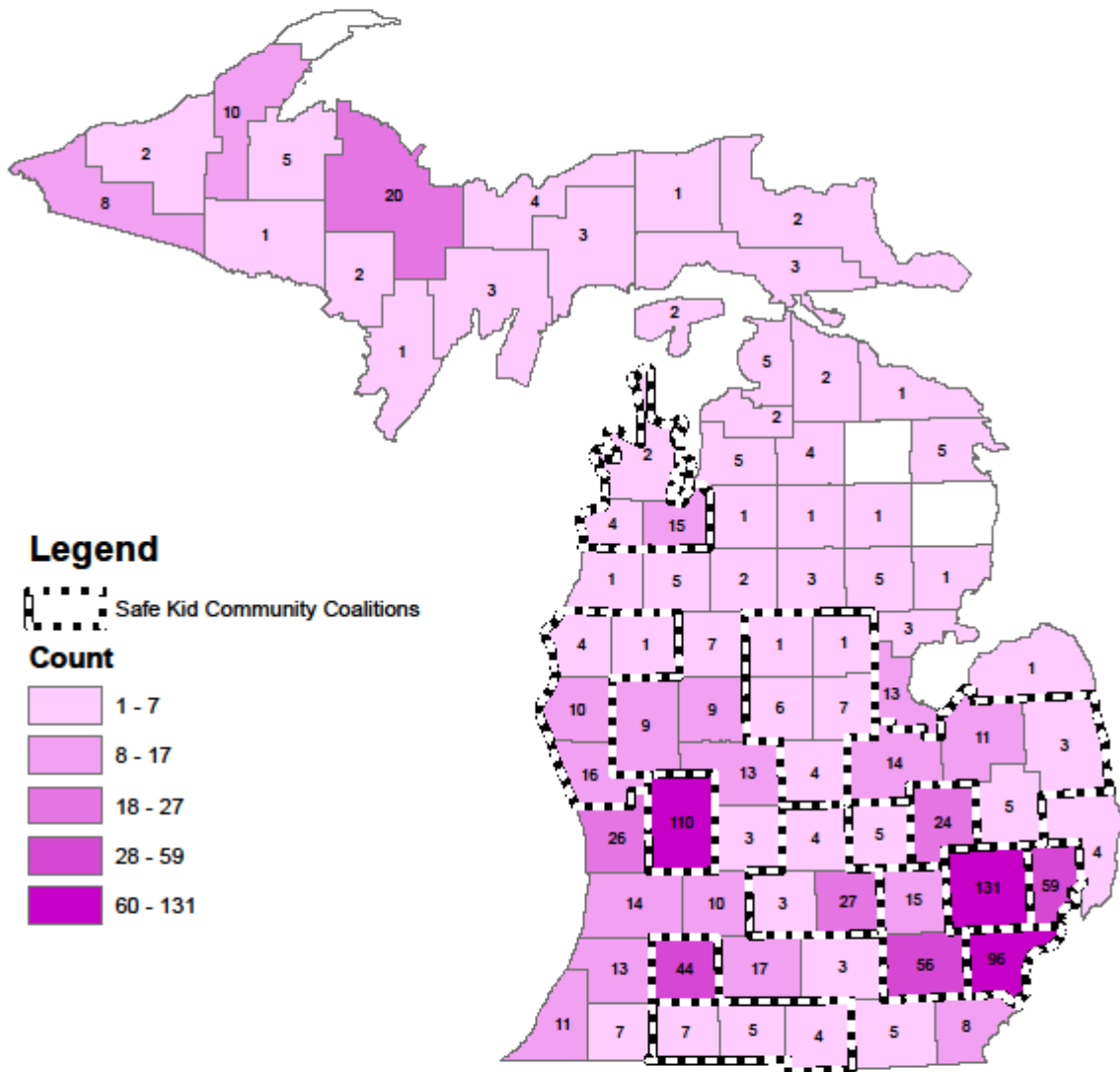
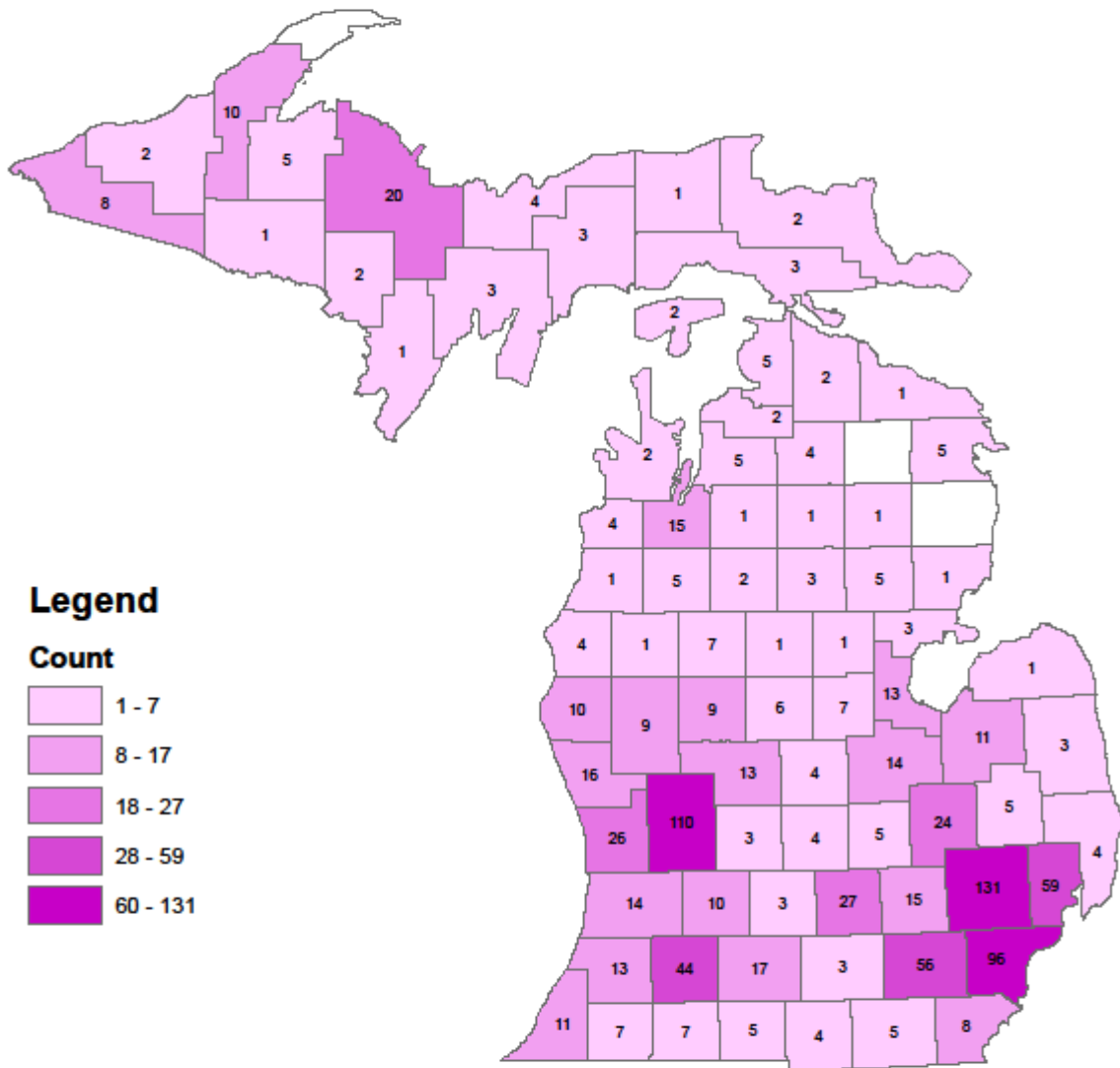


Figure 12: Child Passenger Safety Technicians (CPSTs)  
per county in 2014



[illegible]

Figure 14b: CPSTs trained to work with children with special needs by county in 2014

Figure 14c: CPSTs who speak Spanish by county in 2014

Figure 15: Distribution of CPST survey respondents in 2015

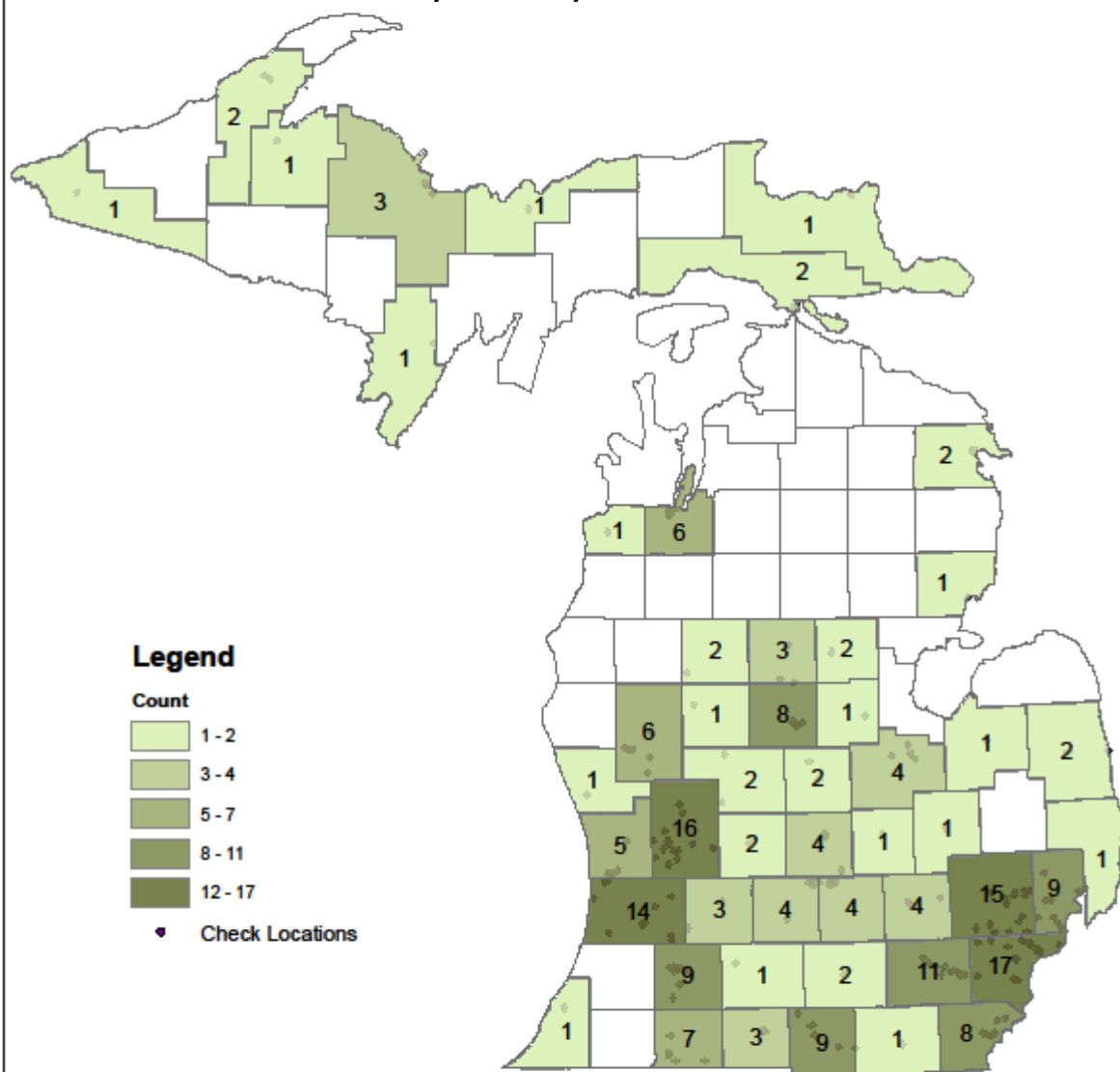
**Legend**

Count

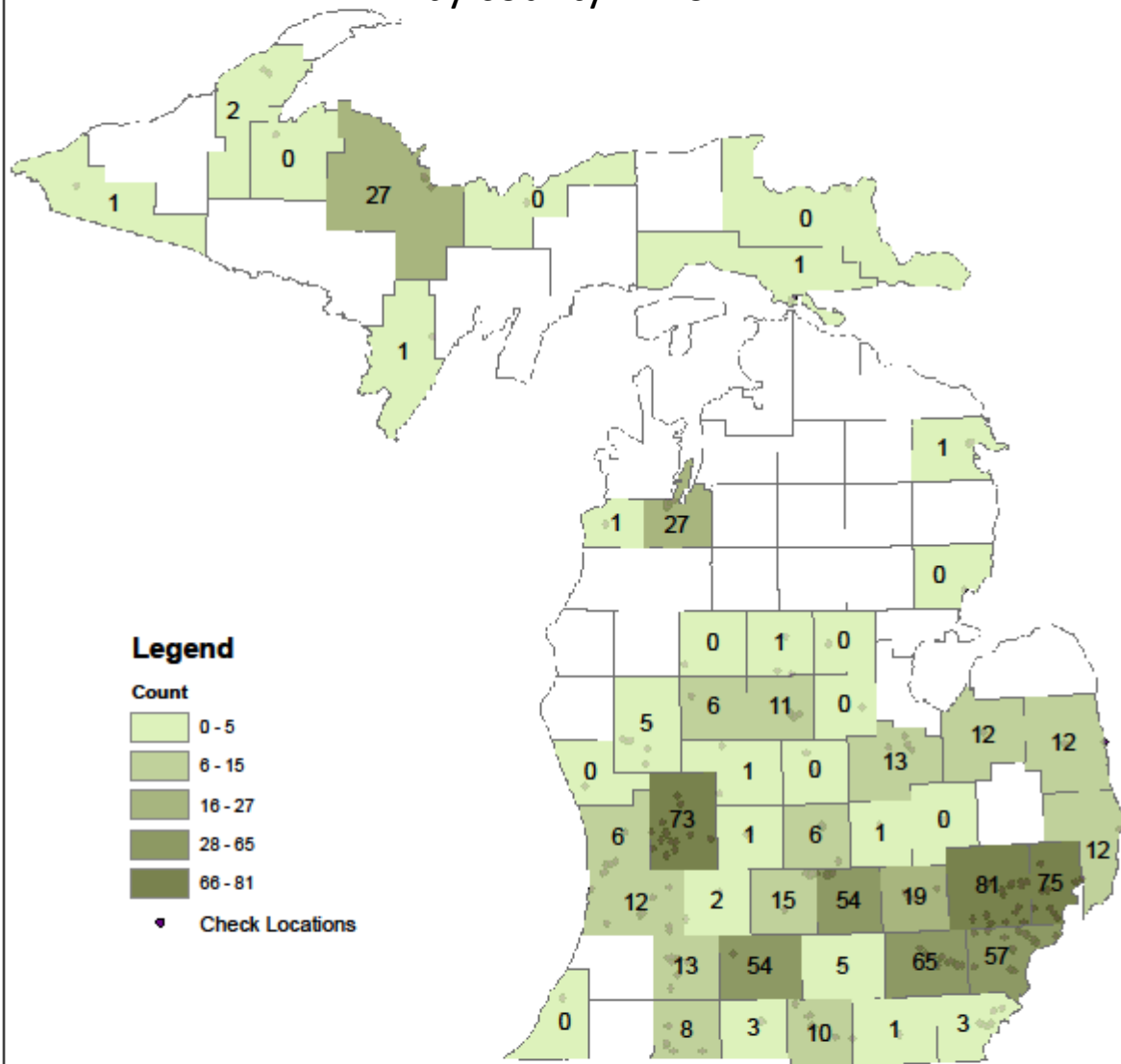
- 1 - 4
- 5 - 6
- 7 - 9
- 10 - 16
- 17 - 82



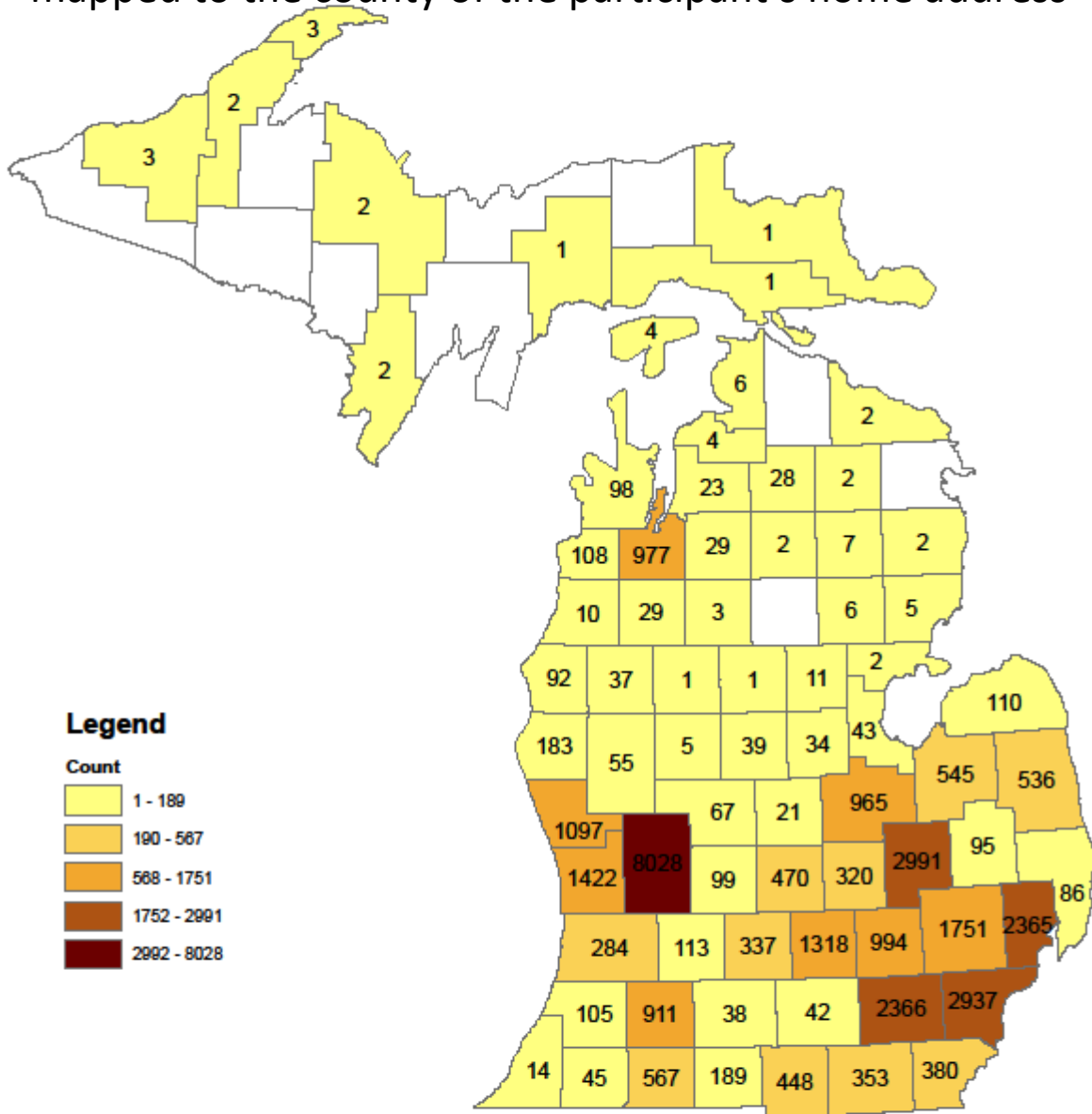
**Figure 40: Count of unique locations for car seat checks**  
(Inspection Stations and Events)  
by county in 2014



**Figure 41: Count of car seat check occurrences**  
 (where frequency of checks was known)  
 by county in 2014



**Figure 43: Number of child restraint systems checked through Safe Kids Michigan 2010-2014 mapped to the county of the participant's home address**



**Figure 44a: Number of Safe Kids Michigan seat checks 2010-2014 that resulted in a change by county**

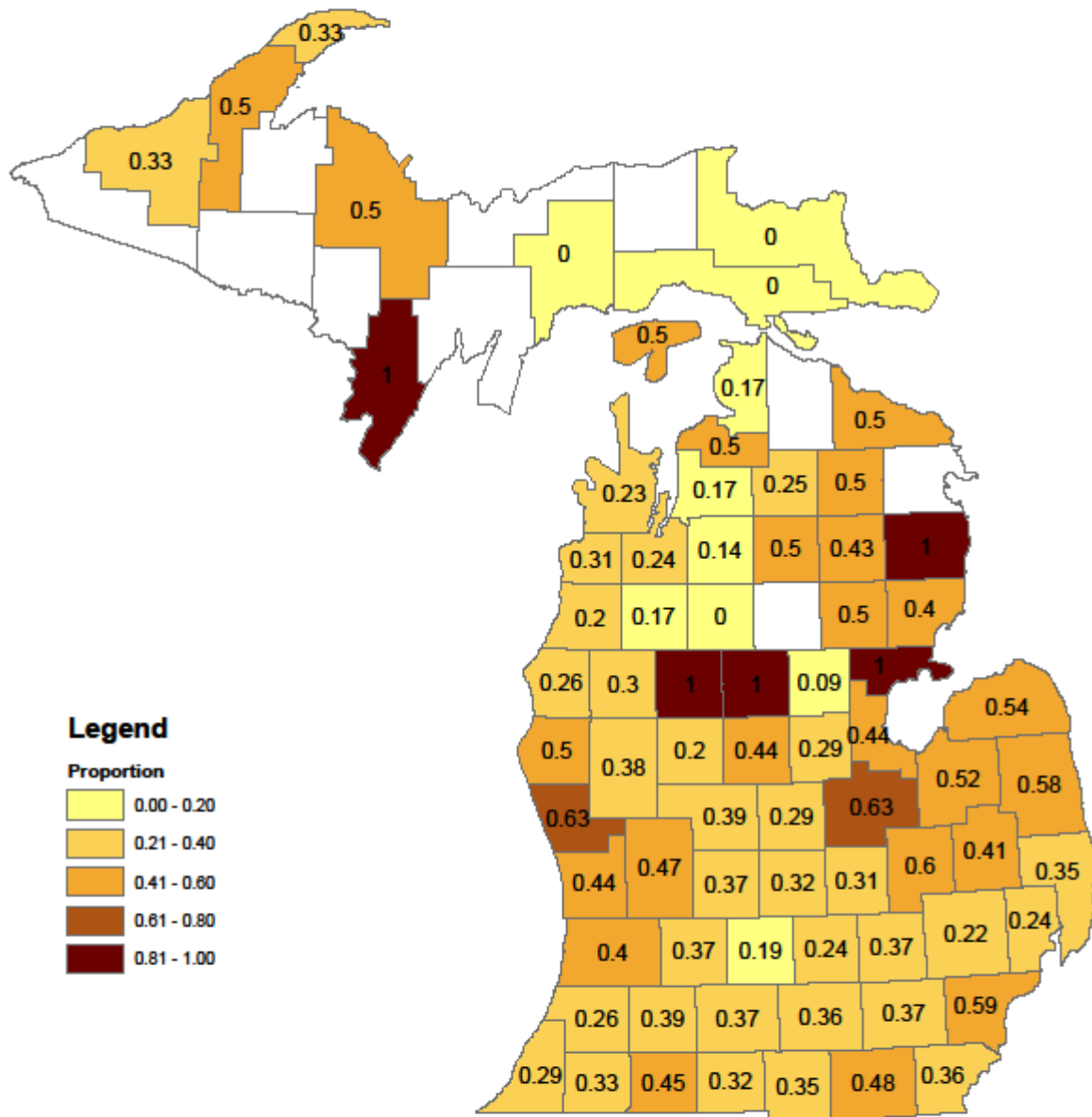
**Legend**

Count

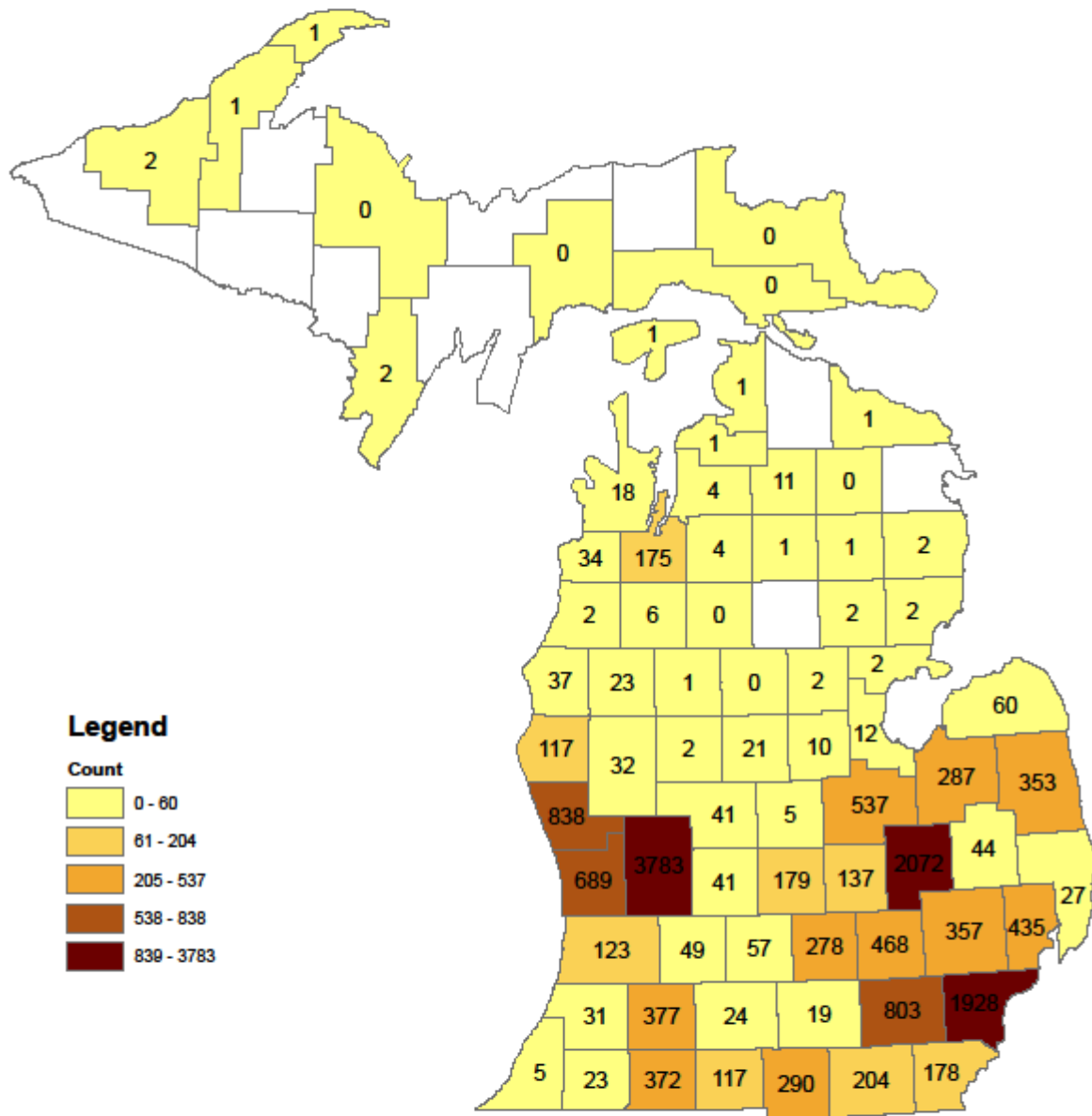
- 0 - 65
- 66 - 168
- 169 - 384
- 385 - 867
- 868 - 3800

The map displays the number of seat checks that resulted in a change for each of Michigan's 83 counties. The highest counts are in the central and southern regions, with some counties exceeding 1,000 checks. The lowest counts are in the northern and western regions, with many counties having 0 or 1 check.

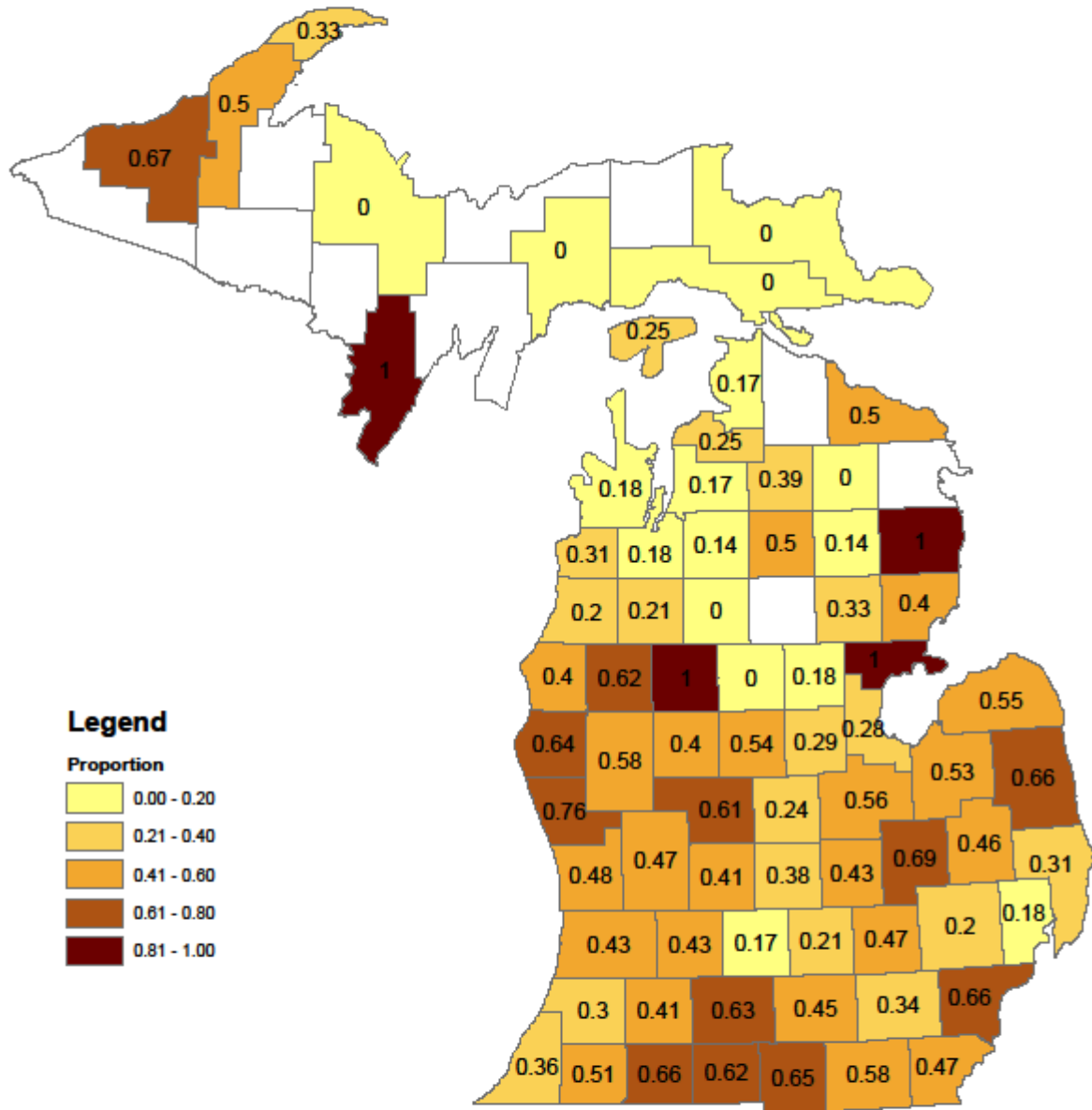
**Figure 44b: Proportion of Safe Kids Michigan seat checks 2010-2014 that resulted in a change by county**



**Figure 45a: Number of Safe Kids Michigan seat checks 2010-2014 where a seat was provided by county**

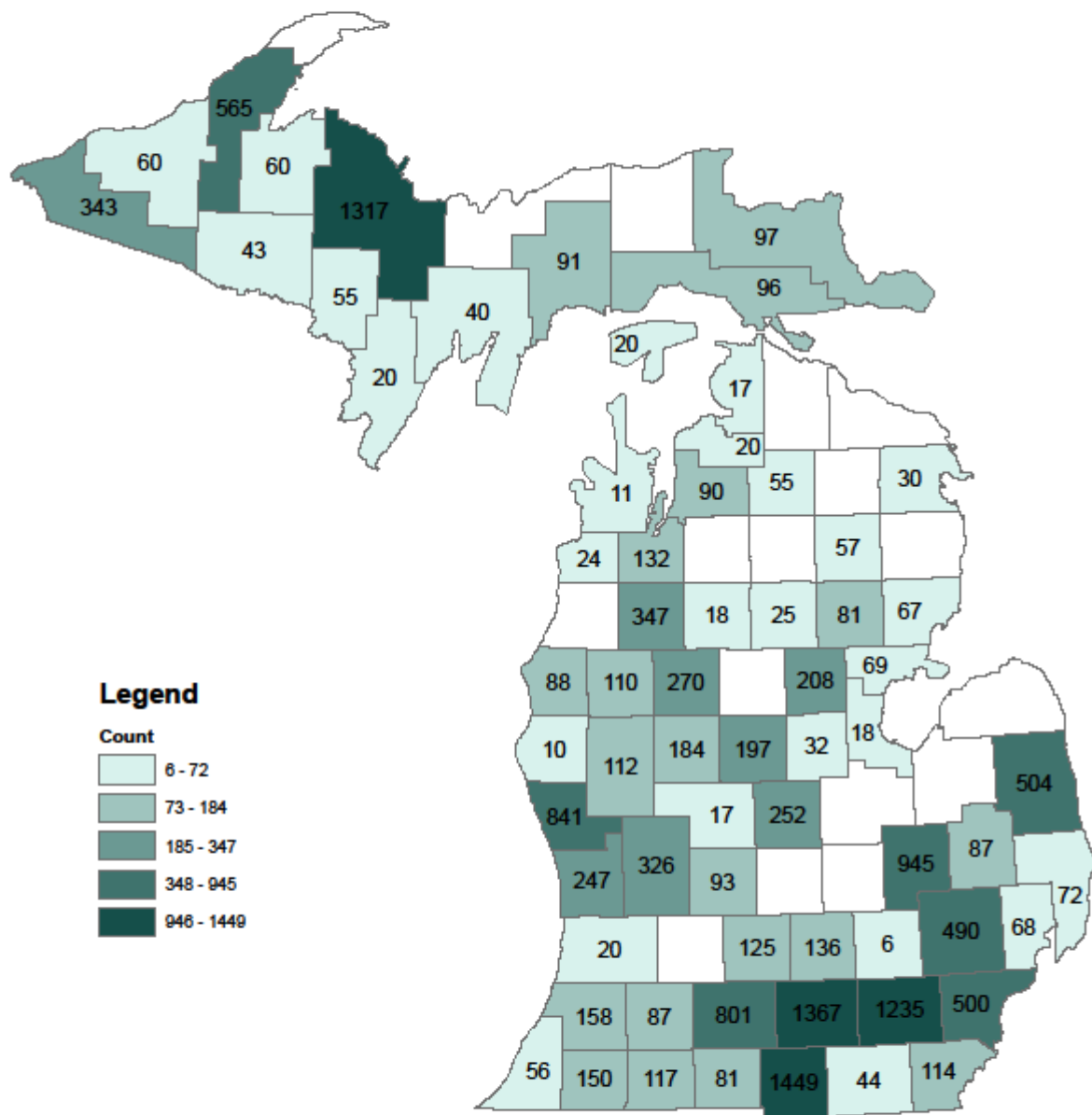


**Figure 45b: Proportion of Safe Kids Michigan seat checks 2010-2014 where a seat was provided by county**



**Figure 47a: Child Restraint Systems distributed by OHSP  
2012-2014**

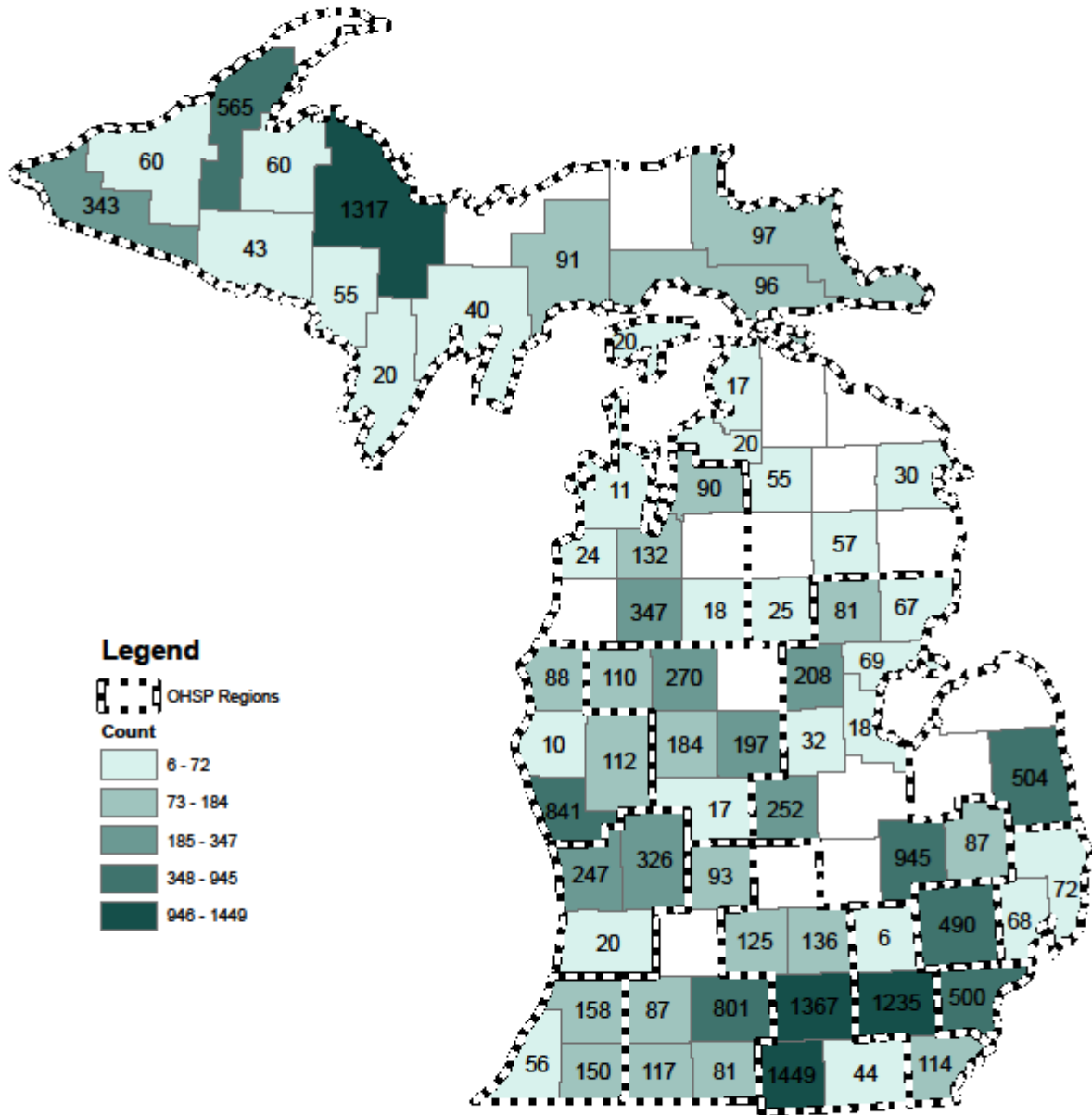
by county of agency or CPST that received seats



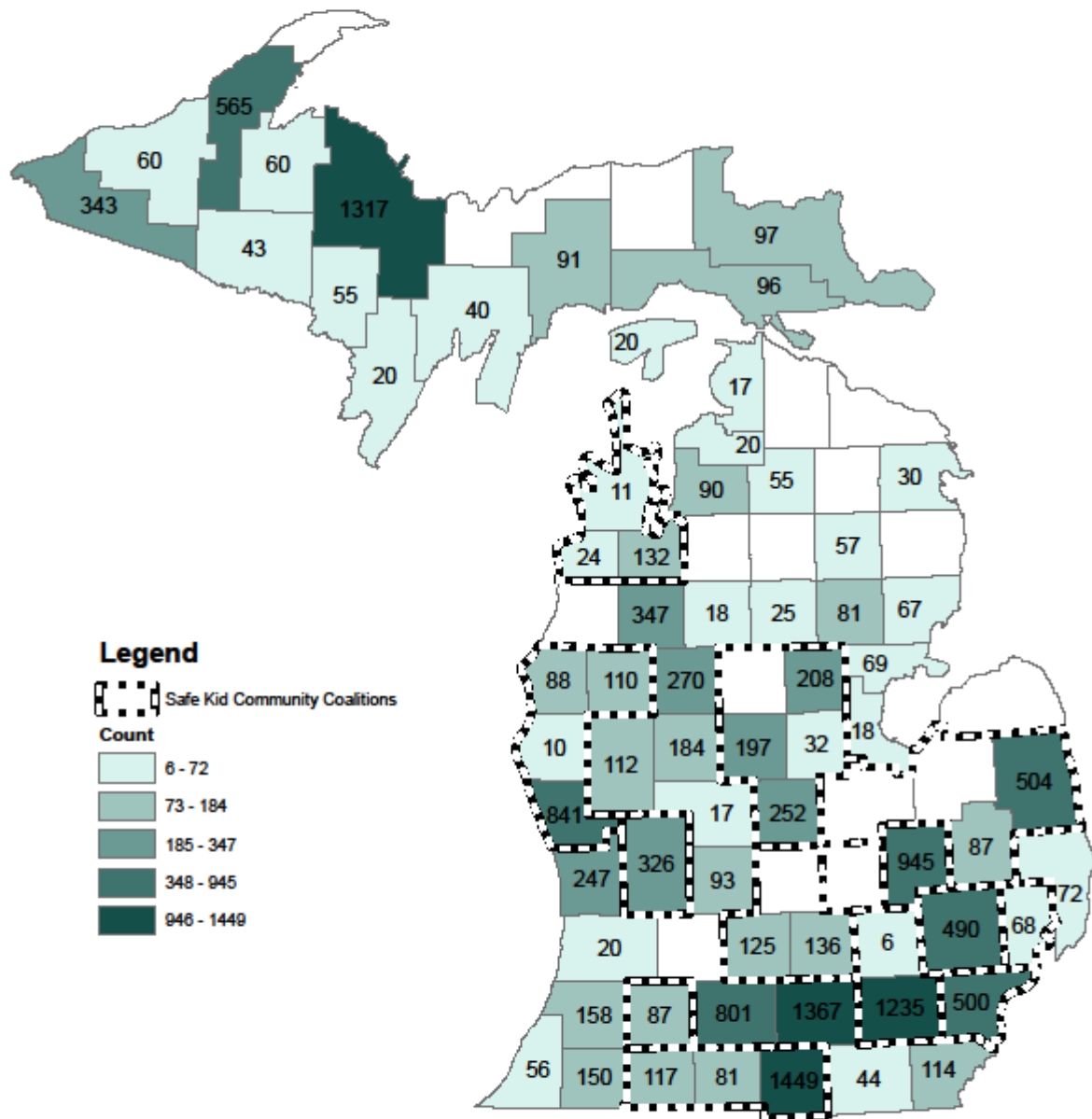


**Figure 47b: Child Restraint Systems distributed by OHSP  
2012-2014**

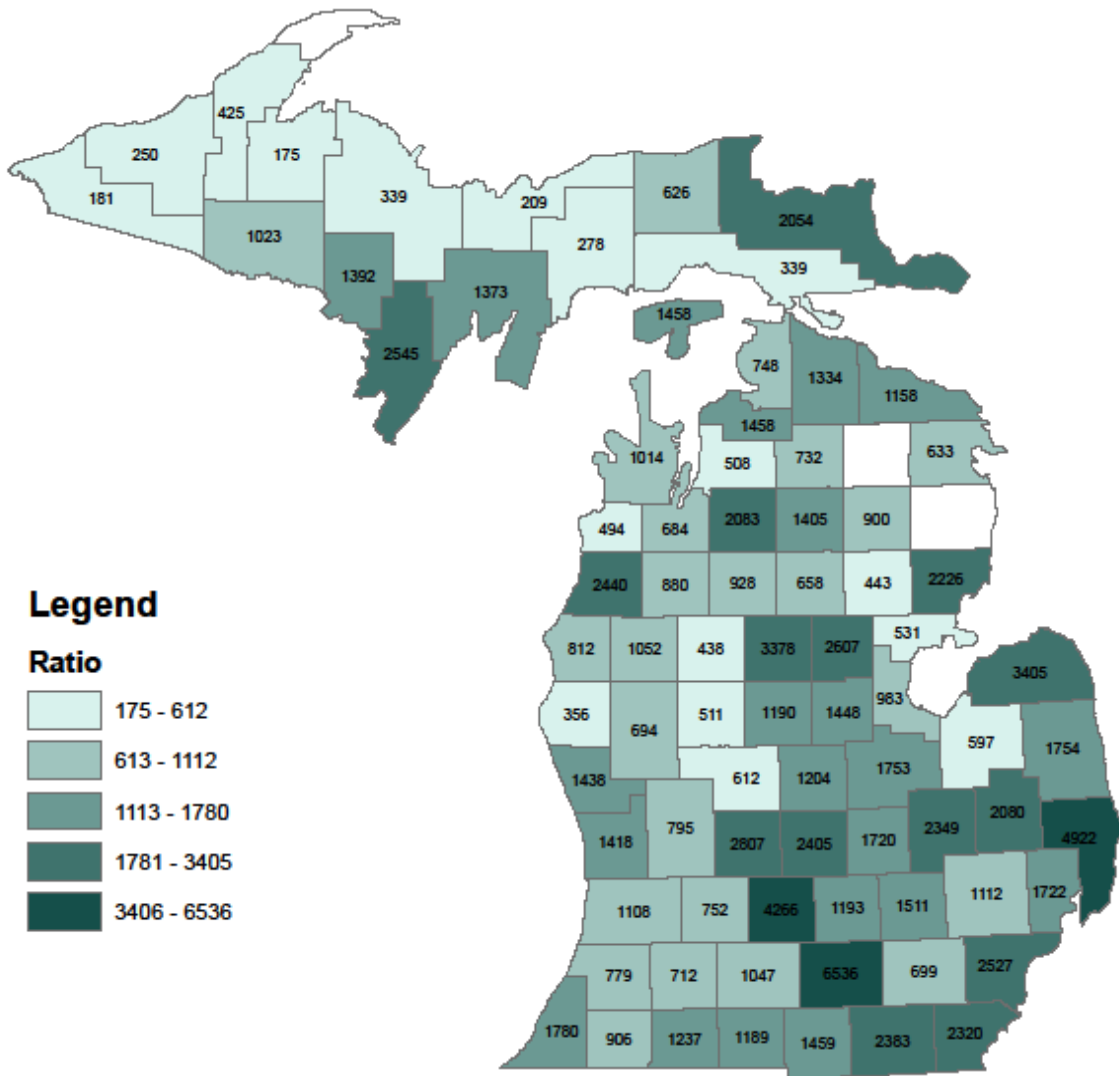
OHSP Regions outlined



**Figure 47b: Child Restraint Systems distributed by OHSP  
2012-2014**  
within Safe Kids Michigan Coalition outlined

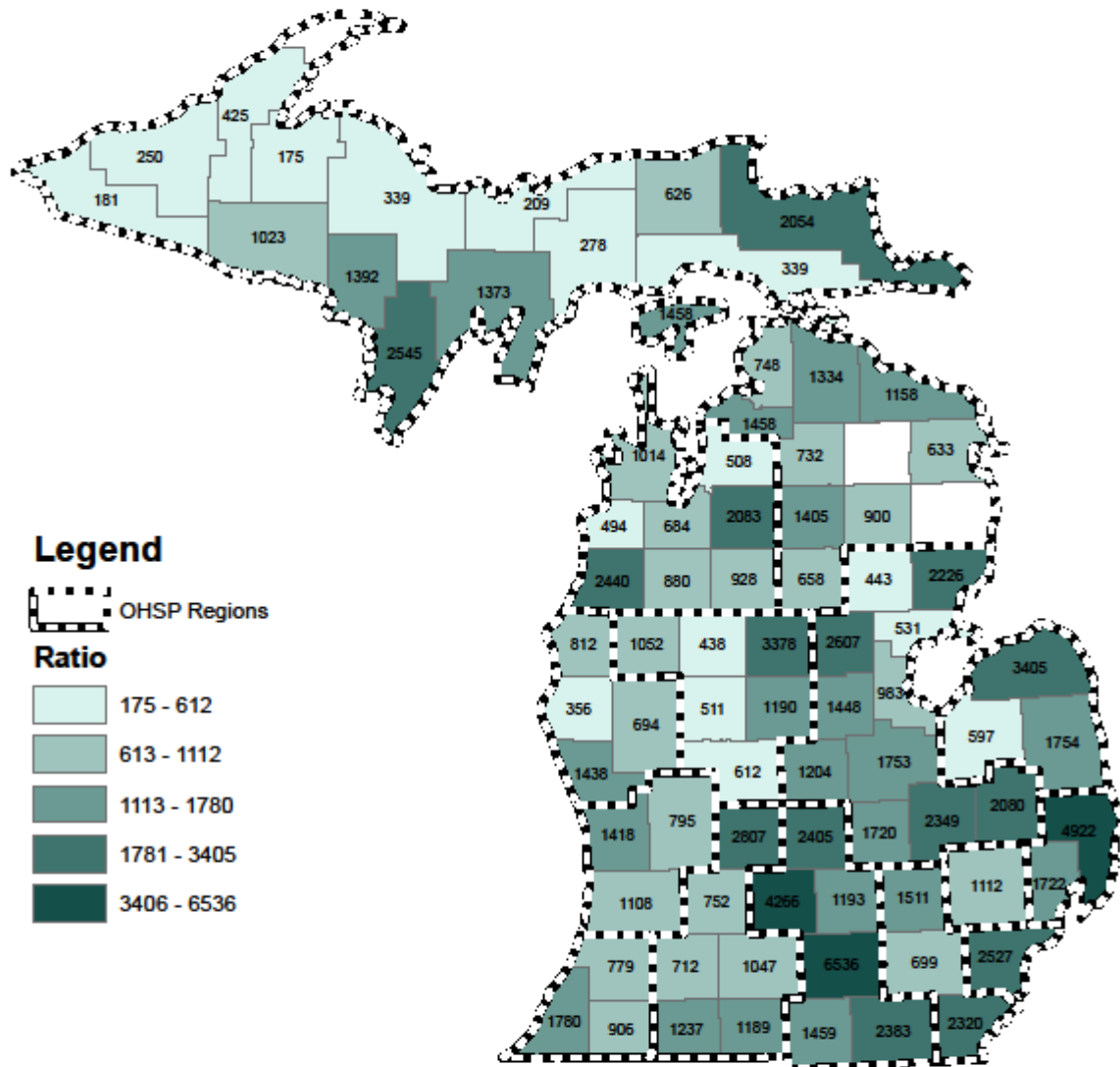


**Figure 48a: Number of children  $\leq 9$  years per CPST per county in 2014**



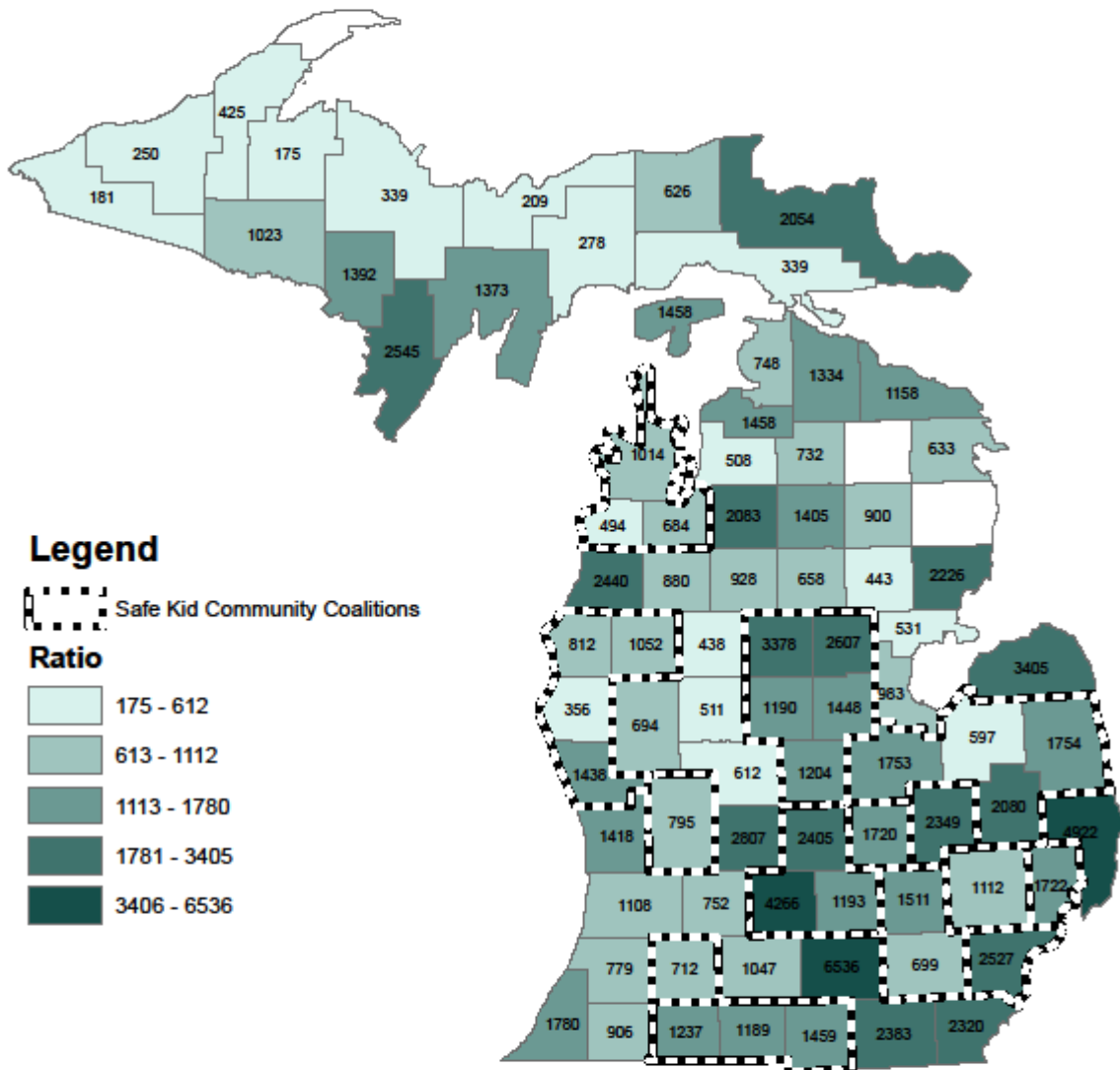
**Figure 48b: Number of children  $\leq 9$  years per CPST  
per county in 2014**

OHSP Regions outlined

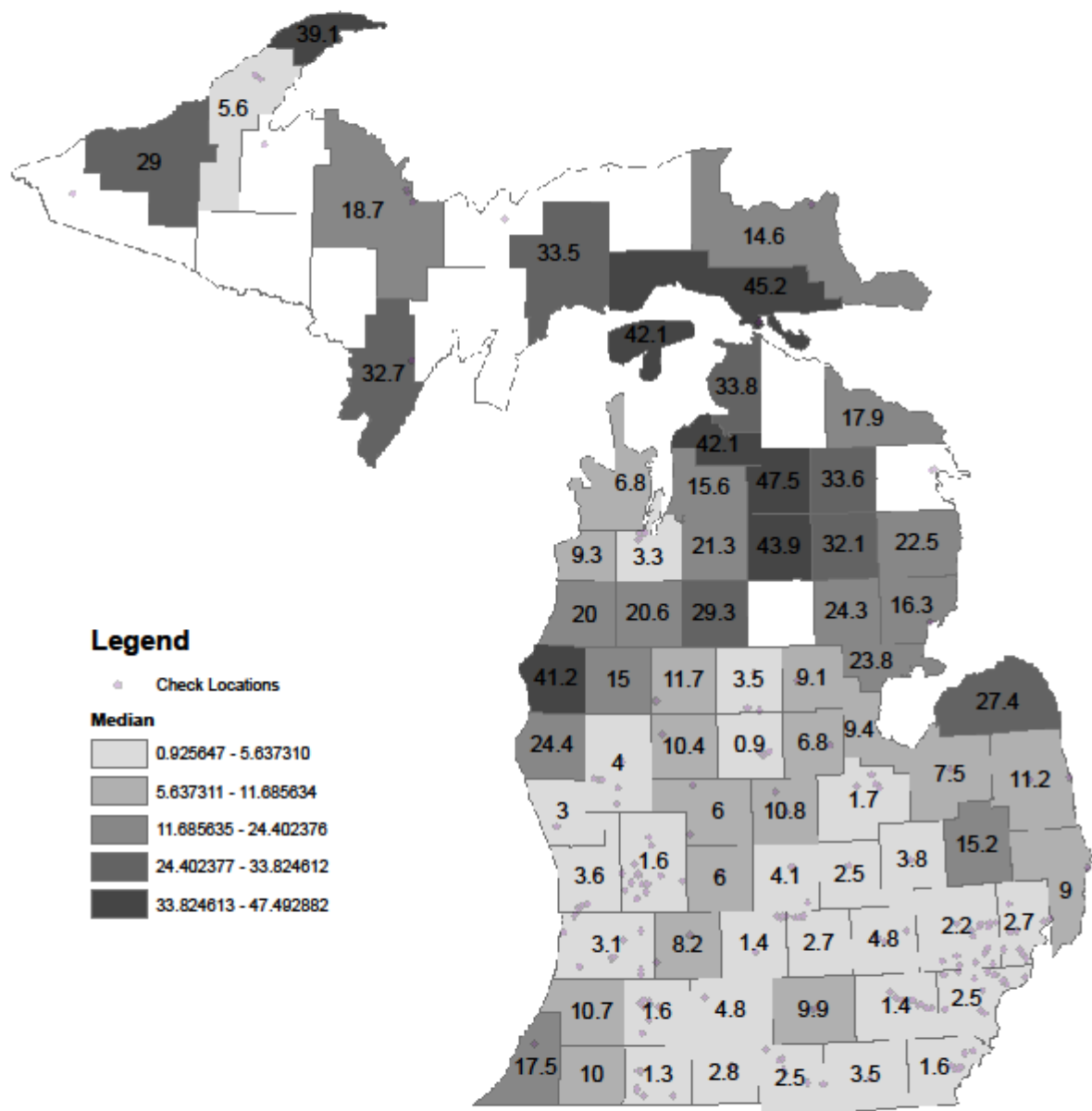


**Figure 48c: Number of children  $\leq 9$  years per CPST  
per county in 2014**

Safe Kids Michigan Coalitions outlined



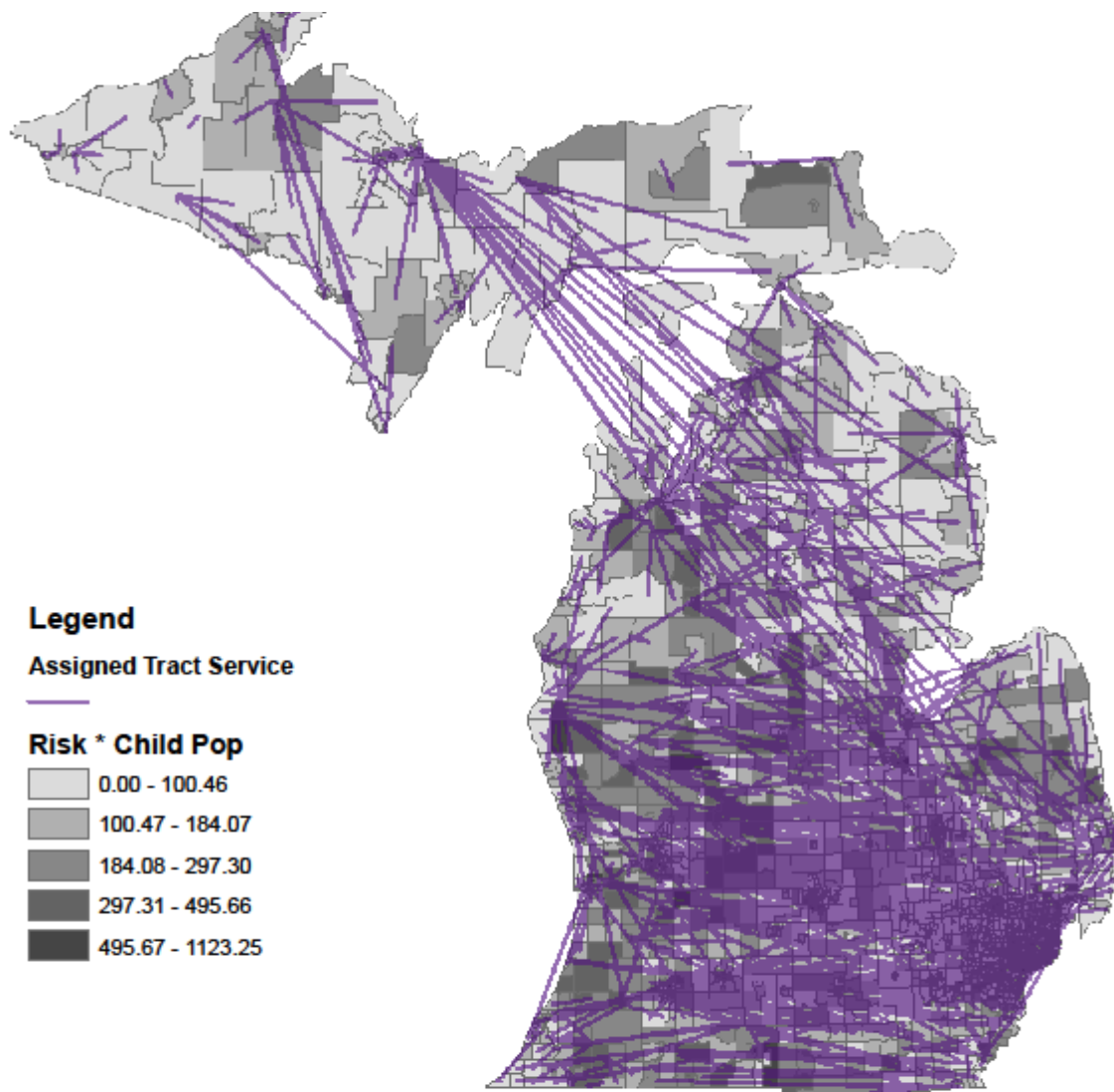
**Figure 49: Estimated median distance traveled in miles from participant home to nearest car seat check location by county based on 2014 seat check locations**



**Figure 50a:**  
**“Spider Maps” Depicting the Output from Location-Allocation Analyses**

Purple lines indicate paths from a CPST to a census tract centroid “as the crow flies”

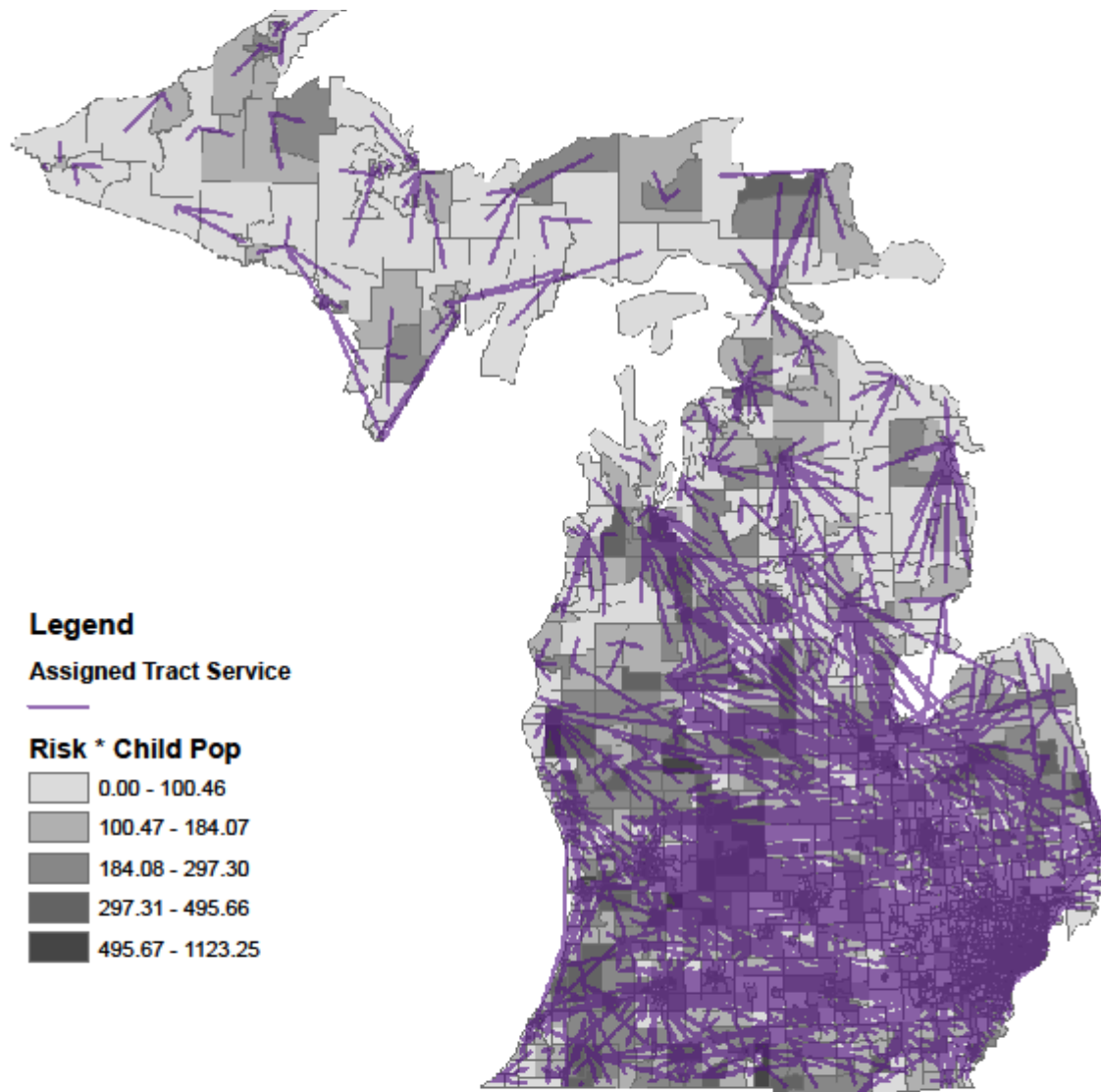
979 CPSTs serving 150 risk-weighted children  
per service point



**Figure 50b:**  
**“Spider Maps” Depicting the Output from Location-Allocation Analyses**

Purple lines indicate paths from a CPST to a census tract centroid “as the crow flies”

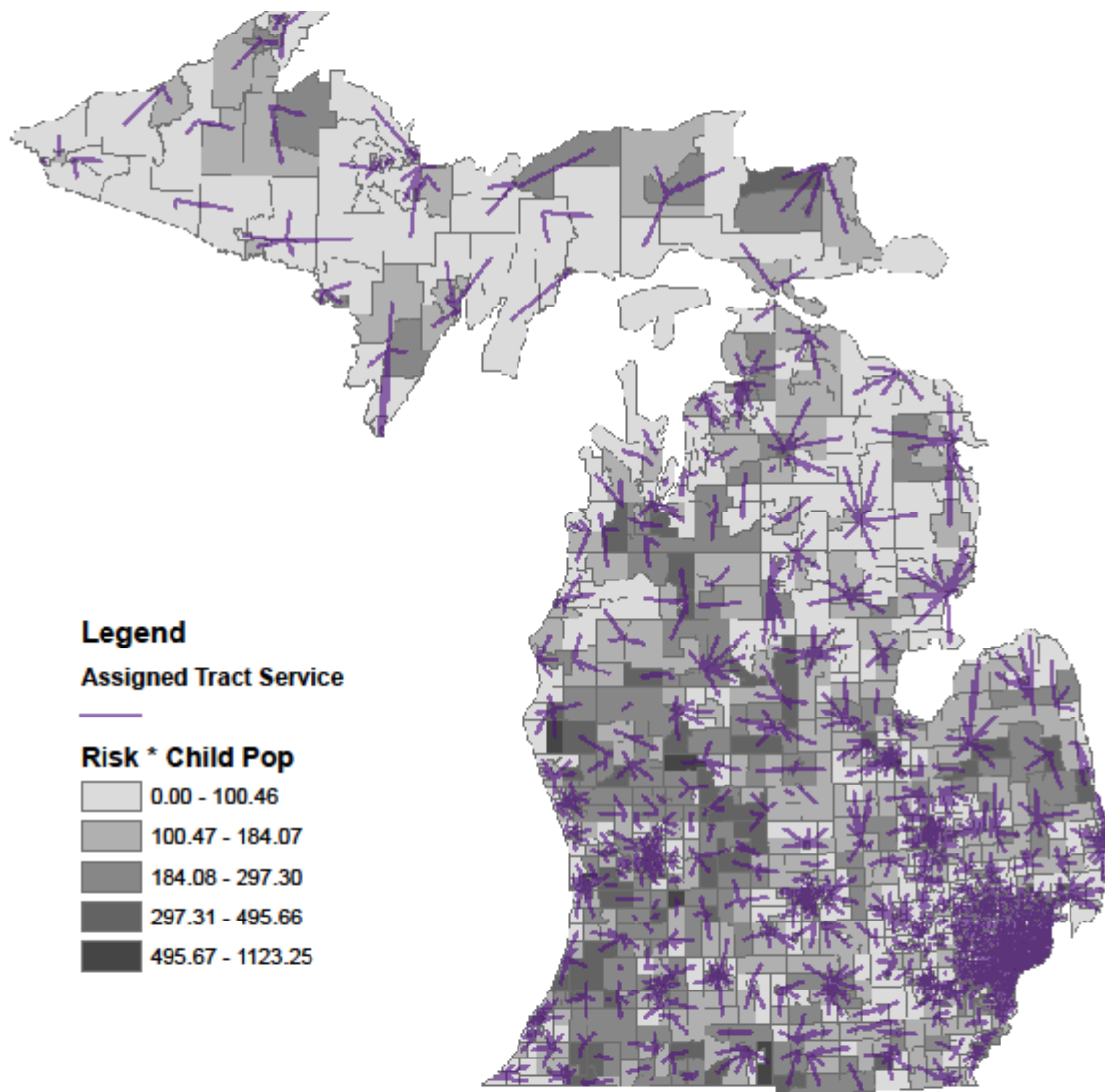
979 CPSTs serving 420 risk-weighted children  
per service point





**Figure 50c:**  
**“Spider Maps” Depicting the Output from Location-Allocation Analyses**

Purple lines indicate paths from a CPST to a census tract centroid “as the crow flies”  
979 CPSTs serving 1500 risk-weighted children  
per service point



**Figure 51: CPST service territories**  
defined by Thiessen polygons  
representing equidistant boundaries between CPST locations

