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# The Interaction of Children Living in Single-Parent Households with Healthcare in Tennessee

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**☒ By checking this box, I indicate that my mentor has read and reviewed my draft proposal prior to submission**

## Abstract

The objective of this paper is to examine how a child living in a single-parent home is able to interact with healthcare in the state of Tennessee in 2020. Family structure in the United States trends away from the nuclear family, with 32% of households containing children headed by single-parents in 2018 as recorded by the United States Census Bureau. Given the knowledge that children in single-parent families are at higher risk for unmet healthcare needs, it is prudent to determine whether these trends are mirrored in Tennessee. Tests of statistical analysis were conducted on publicly available data collected from the County Health Rankings website. The percentage of children living in single-parent homes has increased from 30.88% in 2011 to 32.99% in 2020. There is a correlation between the percentage of children living in single-parent households and the percentage of disconnected youths and childhood mortality rates for 2020 in Tennessee counties. However, there is no correlation between the percentage of single-parent

homes and the percentage of uninsured children for the same counties in 2020. Tennessee counties with high and low percentages of single-parent families are not significantly different in measures of access to a primary care physician, preventable hospital stays, and flu vaccination.

Key Words: Tennessee, children, family structure, single-parent, healthcare, primary care, preventable hospital stays, preventative care, flu vaccine, uninsured, childhood mortality, disconnected youth

**Introduction/Literature Review**

Family structure in the United States is becoming increasingly diverse and thus, the traditional two-parent home is no longer the only environment that American children are raised in. The United States Census for the year 2018 recorded that 10,519,285 of the total 32,777,050 family households in the country with children under 18 years of age are headed by a single parent. This is 32% of American households with children.[1] Considering the wealth of knowledge the scientific community has acquired regarding the effect of environment on the development of a child and the access that child has to resources like healthcare, it is important that healthcare professionals seek understanding on one of the largest contributors to home environment: family structure. Awareness of the challenges our young patients may face at home is essential to formulating a holistic approach to patient care.

It is certainly no secret that familial stability and structure shares a close link with child development. Parental divorce is considered by the scientific community to be an adverse childhood event[2], one that is linked with increased stress levels well into a child's life. Even higher stress levels are documented among children living in a single-parent home following parental breakup.[3] Children not living in nuclear families are also at higher risk of psychosocial issues[4] and even delays in language development measured by comprehension and expression are reported.[5] These trends translate into how these families interact with healthcare. Cross sectional studies of the United States adjusted for socio-economic status have shown that non-traditional family structures are associated with delayed medical care, lower odds of having a routine place for care, and increased odds of not having access to prescriptions or dental care due to cost, compared to families with a married couple at the head. In these same parameters, single-mother families fare worse than single-father families.[6] Further, unmet healthcare needs have

been established as significantly greater in single-mother family types than both two-parent step families and two-parent biological families.[7] Beyond access to care and needs, in the case of common childhood ailments like obesity, the single parent home is associated with higher childhood BMI and behavior that contributes to obesity like food availability and less physical activity.[8] Further, increased rates of single parent homes have been associated with accidental death and homicide from years 1968 to 2010.[9] It is clear that home environment, particularly familial structure and stability, is important for the safety and health of a developing child.

There is a clear need for additional research on how the changing family structure in the United States is affecting the health outcomes for these children. The number of single-parent homes in the country is expected to increase as United States family structure continues to diversify. Thus, this study is aimed at investigating connections that may exist between the rise of single-parent homes in the state of Tennessee, adverse childhood outcomes, and access to primary and preventative care. To establish how Tennessee's family structure composition has changed over time, I investigated how the percentage of children living in single-parent households has changed by county in Tennessee from 2011 to 2020. I then examined correlations between the percentages of children living in single-parent households and percentages of uninsured children, percentages of disconnected youths, and the childhood mortality rate in 2020. Finally, the counties with high rates and low rates of children living in single-parent homes were compared based on rates of access to a primary care physician, preventable hospital stays, and flu vaccination for 2020.

## Research Questions

RQ1: How does the percentage of children living in single-parent households change by county in Tennessee from 2011 to 2020?

RQ 2: How does the percentage of children living in single-parent households correlate with percentage of uninsured children, percentage of disconnected youths, and childhood mortality rate in Tennessee for 2020?

RQ3: How do rates of access to a primary care physician, preventable hospital stays, and flu vaccination in counties with high percentages of children living in single-parent homes compare to counties with low percentages of children living in single-parent homes in Tennessee in 2020?

## Methods

### *Context/Protocol*

The percentage of children living in single-parent households and the percentage of disconnected youths were collected though the American Community Survey 5-year estimates. Data is collected by survey on population and housing information each year from communities to define change over time. The available data was from the years 2014 to 2018. Percentage was calculated for children in single parent homes by dividing the number of children living in single-parent households by the total number of children living in a county. Percentage of disconnected youths was calculated by dividing the number of 16-19-year-olds who are unemployed and not in school by the county population of 16-19-year-olds.

The percentage of uninsured children measure is defined as children under 19 years of age without insurance. This measure was taken from a December 2017 report from the Kaiser Family Foundation reported from the US Census Bureau's Small Area Health Insurance Estimates. The percentage is derived from statistical modeling and thus is more reliable in counties with larger population size within a county. The percentage is calculated from the number of uninsured individuals under the age of 19 divided from the total number of youths under the age of 19 in the county. Childhood mortality information was taken from the National Center for Health Statistics through the National Vital Statistics System. The data compiled by the Vital Statistics System is submitted by the county jurisdictions in charge of reporting births, deaths, marriages, divorces, and fetal deaths. Childhood mortality is considered a rate and is calculated as the number of deaths among children less than 18 years old per 100,000 individuals in the population from 2015 to 2018.

Access to primary care physicians is represented as the ratio of population to the number of primary care physicians as reported by the Area Health Resource File for 2017. The File is itself composed of data from sources including the American Medical Association, the American Hospital Association, the US Census Bureau, Centers for Medicare and Medicaid Services, Bureau of Labor Statistics, and National Center for Health Statistics. The rate of preventable hospital stays was taken from the Centers for Medicare & Medicaid Services Office of Minority Health's Mapping Medicare Disparities Tool, updated in 2017. The measure is determined by calculating the number of individuals hospitalized for ambulatory-care sensitive conditions (can be treated in outpatient setting) per 100,000 Medicare enrollees. Inherently, this measure is restricted to information on patients who receive Medicare insurance coverage. Data for the rate of flu vaccination was taken from the same source. It is calculated as a percentage by dividing

the number of Medicare enrollees who received a flu vaccination in the preceding year by the total Medicare enrollees for that county in 2017.

### *Data Collection*

All the data used for analysis in this study was taken from the 2020 County Health Rankings, a program run by the Robert Wood Johnson Foundation Program. This institution compiles data from various sources and provides ranking statistics for each US county based on the integrated measures. The target state of this study was Tennessee, so the county health rankings data for the measures of percentage of children living in single parent households from 2011 to 2020 and measures of percentage of uninsured children, percentage of disconnected youths, childhood mortality rate, rates of access to a primary care physician, rates of preventable hospital stays, and rates of flu vaccination for 2020 were used for analysis. For purposes of data analysis, counties with a high percentage of children living in single-parent households are defined as 32% and above, and counties with a low percentage are defined as 31% and below. These cut-off percentages were extrapolated from the Tennessee data, halfway between the lowest and highest percentages of children living in single-parent households in the state.

### *Data Analysis*

To determine how the percentage of children living in single-parent households changes by county in Tennessee from 2011 to 2020 (RQ1), I used a paired t-test. To determine how the percentage of children living in single-parent households correlates with the percentage of uninsured children, percentage of disconnected youths, and childhood mortality rate in Tennessee for 2020 (RQ2), I used Pearson correlations. For counties with high percentages of children living in single-parent homes compared to counties with low percentages of children

living in single-parent homes in Tennessee in 2020, to determine how rates of access to a primary care physician, rates of preventable hospital stays, and rates of flu vaccinations differ (RQ3), I used unpaired t-tests.

**Results**

Comparison between the percentage of children living in single-parent households in Tennessee in 2011 versus 2020 using a paired t-test (RQ1) showed that the percentage significantly increased from 30.88% in 2011 to 32.99% in 2020 (*t = 3.085, p = .003*) (Table 1).

**Table 1:** Percentage of Children in Single-Parent Households in Tennessee

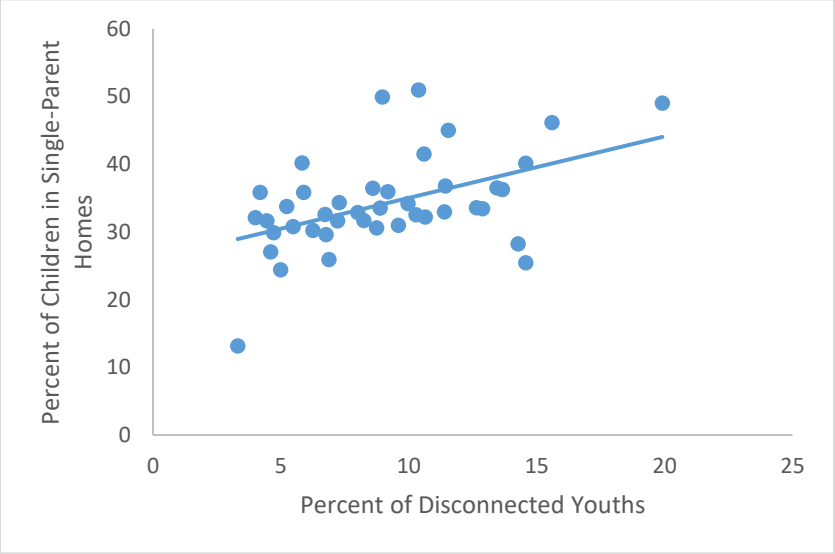
| Year | n | Mean | SD |
|---|---|---|---|
| 2011 | 95 | 30.88% | 6.10% |
| 2020 | 95 | 32.99%[a] | 7.17% |

Abbreviation: SD, Standard Deviation
[a]statistically significantly different from 2011 (p = .003)

Pearson correlation studies investigating the relationship between the percentage of children living in single-parent households and the percentages of uninsured children, disconnected youths, and childhood mortality rate in Tennessee in 2020 (RQ2) yielded variable results. There was no significant correlation between the percentage of children in single-parent households and the percentage of uninsured children (*r = .151, p = .145*). There was a significant moderate correlation between the percentage of children in single-parent households and the percentage of disconnected youths in Tennessee counties in 2020 (*r = .483, p = .001*) where, as the percentage of children living in single-parent homes increases, the percentage of disconnected youths also increase (Figure 1). Another significant moderate correlation between the percentage of children in single parent homes and the childhood mortality rate in Tennessee

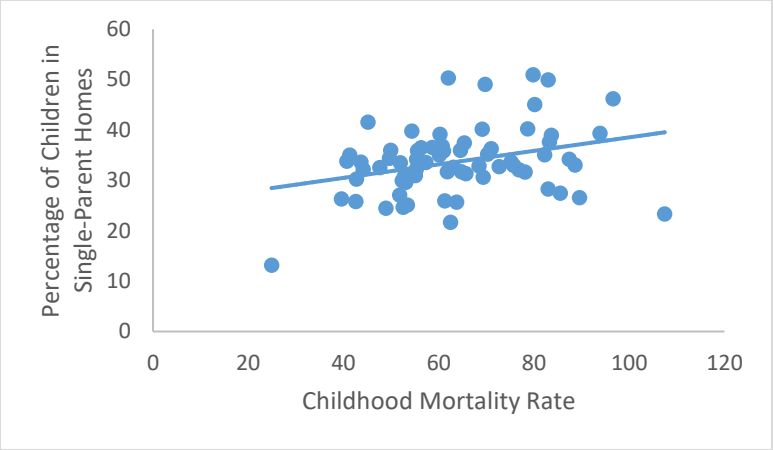
counties in 2020 was discovered (*r = .314, p = .009*) where, as the percentage of children in single-parent homes increases, so does the childhood mortality rate (Figure 2).

**Figure 1:** Correlation Between Percentage of Children Living in Single-Parent Homes and Percentage of Disconnected Youths in Tennessee in 2020




A Pearson correlation indicates a moderate but significant correlation (*r = .483, p = .001*) where, as the percentage of children living in single-parent homes increases, the percentage of disconnected youths also increases.

**Figure 2:** Correlation Between Percentage of Children Living in Single Parent Homes and Childhood Mortality Rate in Tennessee in 2020




A Pearson correlation indicates a moderate but significant correlation ($r = .314$, $p = .009$) where, as the percentage of children living in single-parent households increases, childhood mortality rates also increase.

Rates of access to a primary care physician (RQ3) were not significantly different between Tennessee counties with low percentages of children living in single-parent households (42.35 patients per primary care physician) and Tennessee counties with high percentages of children living in single-parent households (48.60 patients per primary care physician) in 2020 ($t = -.988$, $p = .326$) (Table 2). Preventable hospital stays (RQ3) were not significantly different between Tennessee counties with low percentages of children living in single-parent households (6,138) and Tennessee counties with high percentages of children living in single-parent households (5,717) in 2020 ($t = 1.206$, $p = .231$) (Table 3). Rates of flu vaccination (RQ3) were not significantly different between Tennessee counties with low percentages of children living in single-parent households (46.28%) and Tennessee counties with high percentages of children living in single-parent households (46.52%) in 2020 ($t = -.185$, $p = .854$) (Table 4).

**Table 2:** Access to Primary Care Physicians in Tennessee Counties with High and Low Percentages of Children living in Single-Parent Households in 2020

| County Percentage | n | Mean | SD |
|---|---|---|---|
| Low | 37 | 42.35 | 27.18 |
| High | 53 | 48.60 | 31.02 |

Abbreviation: SD, Standard Deviation

**Table 3:** Preventable Hospital Stays in Tennessee Counties with High and Low Percentages of Children living in Single-Parent Households in 2020

| County Percentage | n | Mean | SD |
|---|---|---|---|
| Low | 39 | 6138 | 296.7 |
| High | 56 | 5717 | 205.2 |

Abbreviation: SD, Standard Deviation

**Table 4:** Rates of flu vaccination in Tennessee Counties with High and Low Percentages of Children living in Single-Parent Households in 2020

| County Percentage | n | Mean | SD |
|---|---|---|---|
| Low | 39 | 46.28% | 7.47% |
| High | 56 | 46.52% | 4.95% |

Abbreviation: SD, Standard Deviation

## Discussion

The percentage of children living in single-parent households significantly increased by county in Tennessee from 30.88% in 2011 to 32.99% in 2020 on average (RQ1). This shows that Tennessee, similarly to the rest of the United States, is increasing in the number of single-parent households. Also interesting is the number's proximity to the United States overall percentage of single-parent homes, 32%.[1] This is important to the rest of the results of this investigation, because a single-parent environment is both stressful to children[3] and affects access to healthcare.[6] Health providers in Tennessee should be aware of these risks as they provide care to increasing numbers of children living in single-parent homes.

A more well-developed view of the Tennessee community was discovered upon correlation investigations. Significant correlations were discovered between the percentage of children in single-parent households and the percentage of disconnected youths in Tennessee counties in 2020 and the percentage of children in single-parent homes and the childhood mortality rate in Tennessee counties in 2020 (RQ2). Within these correlations, as the percentage of children living in single-parent homes increases, the percentage of disconnected youths and the childhood mortality rate increase. If we are seeing correlations between single parent-homes and rates of disconnected youth, counties with larger percentages may need to consider programs to identify youths at risk and provide programs to enhance mentorship opportunities to get these kids back on track. Current guidelines recognize the need for such programs to encourage youths to cultivate support systems by providing access and empowering the development of a network of supportive adults within their communities.[10] However, correlation between family structure and mortality does not seem to stop at the childhood mortality rate in the published literature and may not be as easy to mitigate as numbers of disconnected youths. Living in a household with two parents decreases mortality rates into adult life[11], and as mentioned earlier, is associated with lower rates of accidental death and homicide.[9] Thus, there may be a need to view growing up in a single parent home more definitively as an important risk factor for mortality and violent death that persists throughout life. There was no significant correlation identified between the percentage of children in single-parent households and the percentage of uninsured children in Tennessee in 2020. This is reassuring, as lack of health insurance increases risk for unmet healthcare needs across different family structures.[7]

No significant differences were discovered in rates of access to a primary care physician, preventable hospital stays, or flu vaccination in counties with high percentages of children living

in single-parent homes compared to counties with low percentages of children living in single-parent homes in Tennessee in 2020 (RQ3). Thus, Tennessee's population of single-parent households does not seem to be affecting the access of these children to healthcare. This encouraging finding is more hopeful for the state than literature describing greater incidence of unmet healthcare needs in nontraditional family structures.[6,7] However, this should not be taken as an ultimate truth given the smaller scale of this investigation and other ways of measuring unmet healthcare needs within the Tennessee community that were not employed in this study.

**Conclusion**

This study is limited by using publicly available County Health Rankings data for analysis. The use of aggregate data such as this does not allow for examination of data from individuals with identifiers. For example, one cannot simply examine data that applies to single-parent homes to the exclusion of other family structures or vice versa to compare between the two groups. Thus, correlations must be used, which cannot be used to imply causation and many confounding variables may be present for any research question without the use of controls. However, this study maintained the ability to identify trends in the data by dividing counties into groups based on their classification as having a high or low percentage of single-parent households.

Future investigations may consider looking at similar research questions within non-aggregate data sets to observe whether trends change. Additionally, the effect of being a single-parent on an individual's health access and outcomes should also be investigated to get a more holistic picture of the health-impact of this familial structure. There are also other family structures that are not classified as traditional. Families where children live with relatives rather than parents, families where there is permanent presence of other adults in the home, families

where children have multiple homes in divided parental situations, families with stepfathers or stepmothers, and families led by same-sex parents are only a few examples of this. These other non-traditional family structures should also be investigated in relation to health access and outcomes.

While this study gives a newly enlightened picture of family structure and health in Tennessee in 2020, there is still much to be learned. Communities are heavily impacted by healthcare access and quality. The goal should always be to use new knowledge to advance and improve the state of Tennessee's public health. Hopefully, this and related future investigations will contribute to the pool of resources available to help accomplish the vision of world-class, sustainable healthcare for each unique community.

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