



# Exploring the impact of transportation access on the health and personal finances of patients of one rural FQHC in Central Appalachia

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## Abstract

The coalfields of Central Appalachia face significant health disparities that correlate closely to social determinants of health. This region also faces significant barriers to transportation. Previous studies have shown that transportation barriers can have significant negative impacts on health outcomes and thus may contribute to the health disparities seen in Central Appalachia. We designed two voluntary surveys of patients at a rural FQHC in Central Appalachia to assess the health and financial impact that barriers to transportation to primary care have on this population. We found that not only were patients with barriers to transportation more likely to end up in the emergency department or admitted to the hospital, those with medicaid who should have access to no cost non-emergency medical transportation frequently have to pay someone to bring them to office visits, causing significant financial burden on the patient. Finally we found that patients who have to pay someone to bring them to the clinic were also much more likely to ending up in the emergency department or admitted to the hospital. Considering this and that other studies have shown that use of non-emergency medical transportation is associated with higher likelihood of having regular primary care visits, our study seems to suggest that investment in improved access to non-emergent medical transportation could potentially reduce overall health care spending by reducing emergency department usage and hospital admissions, particularly in rural Central Appalachia.

## Introduction

Health disparities in Central Appalachia are significant and long standing. These include reductions in life expectancy, higher prevalence of chronic disease, and higher rates of accidental death, suicide, and infant mortality. These disparities correlate closely with social determinants of health, including local access to health care and transportation.

Even in counties adequately served by health care providers, transportation from remote areas to population centers can still be challenging for some patients. Public transportation is rare in rural Central Appalachia. Particularly in the West Virginia coal fields. A 2001 report indicated that 94.4% of Wyoming and 86.2% of McDowell Counties' public transit needs were going unmet (Weaver). A 2019 report of the DOT Region 1 (McDowell, Mercer, Monroe, Raleigh, Summers, Wyoming Counties in West Virginia) identified multiple inadequacies in access to transportation for this area. Particularly, this report found that "long distance medical transportation" was the "most critical [transportation] need." As part of this report, 75% of 139 residents surveyed indicated that they had trouble getting to medical appointments. The authors also found that a significant number of households within this region had "zero-vehicles." McDowell County had the highest percentage of "zero-vehicle" households per county at 14% (DOT report). We hypothesize that these transportation needs in Wyoming and McDowell County pose a significant barrier to patients in these areas receiving needed health care services.

Prior research has shown that lack of transportation, along with other social concerns such as lack of child care, lack of sick time, and financial stress, pose significant barriers to accessing primary care (Syed). Indeed, rural patient with a drivers license or who have a family member who can drive them have been shown to attend office visits more regularly. (Arcury et al). Salloum et al. found that cancer patients who lived in neighborhood with a higher percentage of families without access to a vehicle were less likely to receive first line chemotherapy. Access to transportation to health care seems to vary among racial and ethnic groups, which caucasians experiencing less difficulties (Johnson, Call, Fitzpatrick). Similarly, female sex, low income, lack of household support, and lack of education seem to associated with increased difficulty in accessing transportation to health care (Branch et al, Fitzpatrick). There have been mixed results regarding the effect of rural vs urban location in regard to transportation barriers to health care. A study in North Carolina in 1995 found transportation to be a significant barrier to patients receiving care (Blazer, Heckman, Skinner).

A large, nationwide survey in 2008 found that having "no transportation" as barriers to accessing care was associated most significantly with increased emergency department utilization even after adjusting for other factors (Rust et al. 2008). Conversely, another study indicated that use of non-emergency medical transportation services was associated with increased likelihood that medicaid beneficiaries would attend the recommended number of primary care visits annually to care for their chronic conditions (Thomas 2014).

Considering the health disparities in the coal fields of Southern West Virginia, and the poor access to transportation in this region, we hypothesized that transportation difficulties were posing a significant barrier to patients receiving needed primary care services. We were concerned that these difficulties could lead to both significant economic burden as well as poor outcomes for patients in this area. We designed two surveys to test these questions at the Tug River Health Association, a rural federally qualified health center (FQHC) with locations in Wyoming and McDowell County in West Virginia.

## Methods

In 2018 providers at Tug River Health Association identified several patients who were having difficulties keeping appointments due to having to pay someone to bring them to the clinic and were concerned this was negatively affecting patient outcomes. Tug River management team decided to undertake a quality improvement project to determine the scope of this problem, in hopes that they might be able to design an intervention to address it. At that time, a one page survey was developed and distributed to each of Tug River's five practice locations in McDowell and Wyoming County, WV.

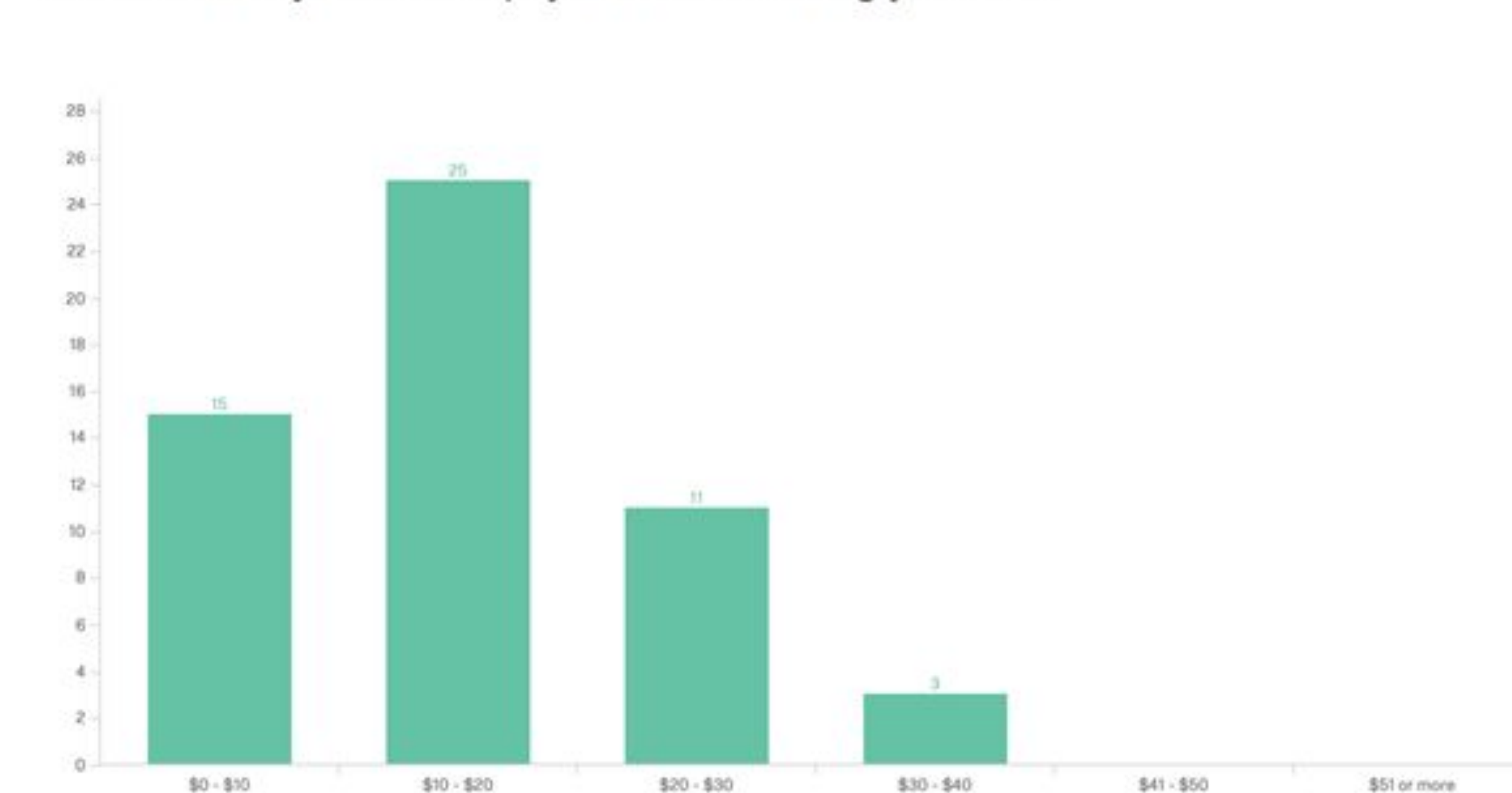
Nurses would administer the survey to patients before seeing a provider, then they would fax the completed surveys to Tug River's Director of Quality Assurance who would then enter the data into Qualtrics for analysis. During the original QA survey period, 927 were collected over the roughly 2 month collection period. The responses were analyzed using JMP Pro 14 statistical software for descriptive statistics, chi-square, and odds ratio calculation.

Afterward, a secondary survey was administered to determine if patients' transportation difficulties were having an effect on their health. These secondary surveys were initially administered in the same way as the primary survey; however, due to staffing shortages at Tug River, we had difficulty getting survey responses collected. Thus, the survey was pushed out electronically to Tug River Health Association Patients via the Electronic Health Record.

A total of 375 surveys were collected. Of these 76 were collected via pen and paper and later entered into Qualtrics, and 299 were collected electronically via the Electronic Health Record communication. Similarly to the first round of surveys, the responses to this secondary survey were analyzed using JMP Pro 14 statistical software for descriptive statistics, chi-square, and odds ratio calculations.

## Results

How much did you have to pay someone to bring you here?



- Of the 650 respondents who answered the question "Did you have to pay someone to bring you here?" 56 (8.61%) answered "yes." Of the patients who responded "yes" to this question, we found that they had over 13 times higher odds of having missed an appointment in the past due to transportation.
- Patients who indicated that they received medicaid benefits were also 2.5 times more likely (OR 2.50, 95% CI: 1.39 – 4.48), (p = <0.01) to have to pay someone to bring them to the clinic.
- In analyzing the second round of survey responses, we found that one in four patients surveyed missed an appointment in the past due to transportation difficulties.
- Patients who missed an appointment due to transportation difficulties have significantly greater odds (3.4 times) than patients who did not miss an appointment of having been in the ER in the past 6 months (OR 3.35, 95% CI: 1.94 – 5.08), (p = <0.0001).
- Patients who missed an appointment due to transportation difficulties have significantly greater odds (3.0 times) than patients who did not miss an appointment of having been in the hospital overnight in the past 6 months. (OR 2.96, 95% CI: 1.48 – 5.96), (p = <0.01).
- In the second round of responses, we found that 11% of patients had to pay someone to bring them to the clinic.
  - Patients who needed to pay someone for transportation have significantly greater odds than patients who did not need to pay someone for transportation (2.4 times) to have been in the ER (OR 2.39, 95% CI: 1.18 – 4.85), (P <0.05) or to have had to stay in the hospital overnight in the past 6 months. (OR 2.99, 95% CI: 1.29 – 6.89), (P <0.05).

## Conclusions

Difficulties with transportation pose a significant barrier to accessing primary care services in one rural FQHC in the coal fields of central appalachia. These barriers significantly correlate with increased emergency department utilization and hospital admissions. In addition to this, transportation barriers also pose a significant financial burden for many patients.

We found that 8-11% of patients at Tug River Health Association have to pay someone to bring them to primary care appointments. If we extrapolate these factors out to encompass all of Tug River's encounters, patients likely paid \$12,000 to \$24,000 out of pocket per year to get to our offices! Since the majority of the patients paying for transportation had medicaid, this means that the poorest residents of the most socio-economically depressed counties in the county are having to pay out of pocket to access primary care.

Range	Number of patients paying	Percent paying this portion	Cost at min point	Cost at mid point	Cost at max point
\$0 - \$10	326	0.28	\$0	\$1,628	\$3,256
\$10 - \$20	543	0.46	\$5,427	\$8,141	\$10,854
\$20 - \$30	239	0.20	\$4,776	\$5,970	\$7,164
\$30 - \$40	65	0.06	\$1,954	\$2,280	\$2,605
8% of the 19,541 patients seen in 2018	1563		\$12,157	\$18,018	\$23,879
25% of patients who were reimbursed	1172				

What's more, having to pay out of pocket for transportation to primary care services was a strong predictor of emergency department and hospital utilization. Among our participants poor access to transportation to primary care was associated with a 3.4 times greater risk of ED usage and 3 times greater risk of being admitted to the hospital. Such services put a significant financial burden on medicaid. Since other studies have shown that non-emergency medical transportation utilization improves access to primary care services. Considering that financing for such services is often in jeopardy (Chaiyachat), further investigation is warranted to fully understand the health related and financial outcomes of such services and how to maximize their effectiveness.

Likewise, modern interventions to transportation barriers such as utilizing ride share programs like Uber and Lyft to bring patients to appointments, and using telemedicine to connect providers with patients virtually have been proposed. However, current literature is inconclusive regarding the effect of such interventions on patient outcomes (Richardson, Eisenberg, Chaiyachat, Cartwright, Hale). Further research is needed to determine the overall effect of these interventions and to determine the populations and medical specialties for which they are most effective.

## References

See Attached