

Left behind again: Rural home health services in a Medicaid pediatric accountable care organization

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Abstract

Purpose: To contrast trends in rural and urban pediatric home health care use among Medicaid enrollees.

Methods: Medicaid administrative claims data were used to assess differences in home health care use for child members in a large pediatric accountable care organization (ACO) in Ohio. Descriptive statistics assessed rural and urban differences in health care use over a 10-year period between 2010 and 2019.

Findings: Pediatric home health care use increased markedly in the low-income (CFC) and disabled (ABD) Medicaid categories. Over the past 10 years, CFC-enrolled children from urban communities have seen more home health visits, fewer emergency department (ED) visits, and more well child visits compared to rural CFC-enrolled children. Children enrolled due to disabilities in urban communities have also seen more home health visit use but fewer preventive care visits than their rural counterparts.

Conclusions: Within a pediatric ACO, rural home health care use has remained relatively stagnant over a 10-year period, a stark contrast to increases in home health care use among comparable urban populations. There are likely multiple explanations for these differences, including overuse in urban communities, lack of access in rural communities, and changes to home health reimbursement. More can be done to improve rural home health access. Such improvement will likely necessitate large-scale changes to home health care delivery, workforce, and financing. Improvements should be evaluated for return-on-investment not only in terms of direct costs, that is, reduced inpatient or ED costs, but also in terms of patient and family quality-of-life or key indicators of child well-being such as educational attainment.

KEYWORDS

access to care, home care services, home health services, Medicaid, rural pediatric care, utilization of health services

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Home health in Medicare populations has been observed to improve quality of life and keep elders and disabled people within their own homes and communities. It has been less frequently studied in pediatric Medicaid populations. In pediatric populations, there is emerging evidence that home health decreases costs, reduces hospital length of stay, reduces rehospitalizations, and relieves burdens on families.¹⁻⁴

Unfortunately, as with many other specialty health services, rural communities are more often lacking in home health services.⁵ There are a variety of reasons that home health agencies would be less accessible in rural communities. The costs of transportation and increased travel make low payments in home health that much less attractive to business owners evaluating market prospects. Many rural areas still do not have reliable broadband services for electronic records and communication. Training of the diverse specialists necessary in caring for children with chronic and complex specialty conditions is in short supply in rural communities. Although these challenges were reported for Medicare, they should be similarly relevant for Medicaid. Furthermore, the recent large-scale changes to Medicare home health reimbursement may impact home health agencies' ability to deliver pediatric home health services, as Medicare is the largest payer in the country. Access to Medicaid home health services for children has not been studied to date, nor do we know how effective routinely administered home health services are for rural children. Understanding the baseline trends in pediatric home health can inform future policies.

We sought to determine if pediatric Medicaid home health service use differed by patient residence in rural or urban counties. We also examined the types of home health services provided in each area and explored other child health care use trends in Medicaid. We anticipated that rural Medicaid-enrolled children would receive fewer home health services, especially those involving complex specialty care, and that they would have higher use of emergency room and inpatient care than their urban counterparts. We examined these questions in a large Medicaid pediatric accountable care organization (ACO) that spans 34 counties in Ohio and has an active membership of approximately 325,000 child members.

METHODS

We used Medicaid administrative claims data between 2010 and 2019 for Partners for Kids (PFK) members. PFK is a pediatric Medicaid Accountable Care Organization that is fiscally responsible for Medicaid Managed Care children in its 34-county service area. Children are members of PFK as a result of their residence in 1 of the 34 counties in central and southeastern Ohio and participation in a Medicaid managed care plan. The service area covers both urban centers like Columbus and more rural Appalachian communities. The membership within PFK counties averages 325,000 Medicaid enrollees at any given time. We examined paid administrative claims data. We further analyzed the Medicaid populations by their eligibility categories. In Ohio, low-income families are enrolled in the Covered Families and Children (CFC) program. Children with a disability and lower income are enrolled in the aged, blind, and disabled (ABD) Medicaid program, and children in the child welfare system are enrolled in the

adoptive, foster, and kinship (AFK) program. Prior to 2013, disabled children enrolled in Medicaid were part of the fee-for-service Medicaid program. In 2013, this population was transitioned from fee-for-service to Medicaid Managed Care and subsequently their care was delegated to PFK. Children eligible for Medicaid due to foster care, adoptive or kinship care were similarly incorporated into PFK in 2017. As eligibility requirements differed and could lead to differences in health care use and need, we analyzed these Medicaid programs separately. For children in the CFC program, we analyzed administrative claims data between 2010 and 2019, for those in the ABD program, we analyzed claims between 2013 and 2019, and for those in the AFK program, we analyzed claims between 2017 and 2019.

Categorization B of the Rural-Urban Commuting Area codes was used to define urban-focused, large rural, and small/isolated rural cities and towns. As complexity of disease could affect many types of health care use, we used the work of Feudtner and colleagues to define pediatric complex chronic conditions.⁶

We calculated home health use per 1,000 members in the following categories: total home health visits, home health visits with health aides, and home health visits with skilled nursing. Yearly trends by rurality were assessed using a linear regression model which included rurality, year, and a rurality and year interaction. Each Medicaid program (CFC, ABD, and AFK) was analyzed separately. We calculated the marginal effect of an additional year by rurality (urban, large rural, and small/isolated rural community).

For each Medicaid program (CFC, ABD, and AFK), we also calculated annual health care use in the following categories: emergency department (ED), evaluation and management (E&M) visits, hospitalizations, well child E&M visits, nonemergent transportation, and emergent transportation. The procedure codes used to define home health visits, ED visits, well child visits, nonemergent transportation, and ambulance claims can be found in the Supporting Material.

Differences in average yearly health care use by rurality (urban, large rural cities/towns, and small/isolated cities/towns) were assessed using one-way ANOVA. Each Medicaid program (CFC, ABD, and AFK) was analyzed separately. An alpha level of 0.05 was considered statistically significant. All analyses were done using Stata 16.0 (StataCorp, College Station, TX). This study was approved by the Nationwide Children's Hospital Institutional Review Board.

RESULTS

Demographically, these Medicaid groups (CFC, ABD, and AFK) are very similar between rural and urban communities, although there are some minor differences (Table 1). Annually, the percent children enrolled in Medicaid through the CFC program with a pediatric complex chronic condition differed slightly by rurality, with 4.6% in small rural, 4.9% in large rural, and 4.8% in urban communities ($P = .02$). The percentage with a pediatric complex chronic condition did not differ by rurality among children enrolled in the ABD or AFK programs. However, both programs, ABD and AFK, had a higher percentage of their population

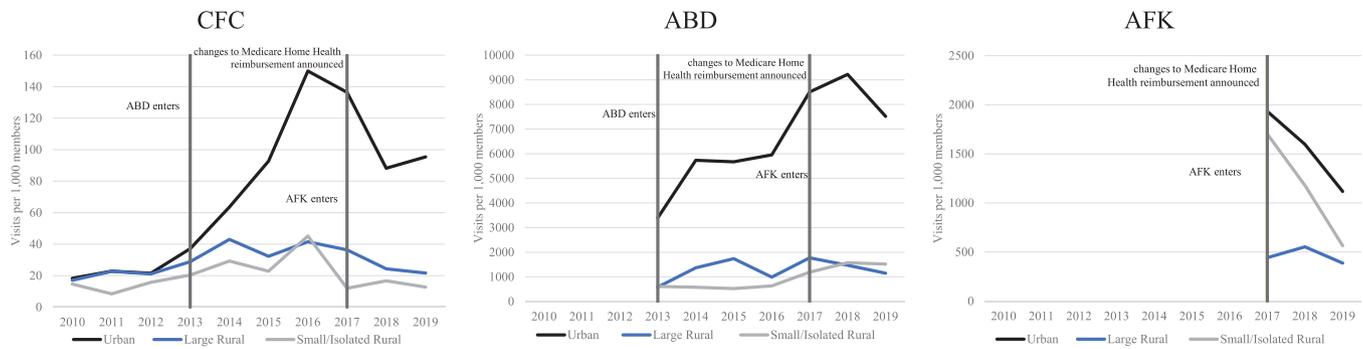


FIGURE 1 Total home health visit use by Medicaid program and rurality, 2010-2019
Abbreviations: ABD, aged, blind, and disabled; AFK, adoptive, foster, and kinship care; CFC, covered families and children.
Scales differ by Medicaid program

program residing in urban communities ($P < .001$), while their counterparts in large rural and small rural communities have not seen such growth ($P = .609$ and $P = .166$, respectively). Since becoming members of the ACO in 2017, there has been a decrease in home health use among children enrolled in the AFK program residing in urban ($P = .005$) and small rural communities ($P = .002$), while no significant differences were seen among those residing in large rural communities ($P = .644$).

While overall urban home health has grown over the past 10 years, the most dramatic growth has been in home health visits with health aides in urban communities. This growth in urban home health aide use is seen among children enrolled in the CFC and ABD programs (Table 3, $P < .001$). There has been relatively little growth in rural communities. Across all communities, skilled nursing home health visits have increased over the years among children enrolled in the ABD program. There has been a yearly decrease in home aide and skilled nursing home health visit use among children enrolled in the AFK program who resided in urban and small rural communities since they entered managed care in 2017.

DISCUSSION

We find that home health use is 2-6 times higher among urban children than rural children depending on the Medicaid eligibility group. The majority of this use appears to come from increases in visits with home health aides. There are likely many reasons for these findings in home health use. Access in rural communities is known to be limited, and access to pediatric home health services is likely even more limited. Financial disincentives, such as unfunded regulatory mandates and no coverage for physician supervision, provider workforce shortages, and greater distances between patient homes, are just a few of the challenges to home health care in rural communities.⁷⁻⁹ The lower average payment rates in pediatrics, combined with a smaller patient pool and greater need for specialty training for staff, intensifies the rural home health care access challenges that children face compared to the challenges adults face. It could also be that patients seen by providers in

urban settings, or by providers who frequently see complex chronic disease patients, may be more aware of the steps that must be taken to get home health care services approved. As a result, the type of provider that children visit could also impact their access to home health care services. In addition, the announcement of major changes to Medicare home health reimbursement may have greatly diminished the home health agencies that serve these areas. These changes likely pushed most home health agencies to reorient their care and approval process.^{10,11}

More work needs to be done to understand the implications of these changes on pediatric services. Song et al¹² found decreases in home health use when comparing Medicaid Managed Care enrolled patients to Medicaid fee-for-service patients in the ABD population. They reported a 4-percentage-point decrease in access to home health care service after transition into Medicaid Managed Care. This is a 26% relative decline over the rate in the direct Medicaid fee-for-service population. A difference-in-differences study design was used, allowing for causal inferences about the effect of implementing an ACO in this ABD population. However, as with any difference-in-differences study, if there are factors that disproportionately impact the ACO group in the post period, then analyses are at risk of attributing those differences to the ACO instead of the true reason for the differences. For example, if covered benefits or billing processes changed in the ACO region as compared to the non-ACO region following the transition into managed care, then benefit coverage or billing processes could be the reason for the decline in home health rather than the ACO specifically. Given the limited information on pediatric home health use, additional research is merited to understand time variation and secular trends, such as evolution of federal health policy or more local payment reforms, such as formation of ACOs.

In contrast to our assumptions about home health services preventing use of emergency or inpatient care, we did not see significant differences in the overall health care use of these services among children enrolled in the ABD program by rurality. There were some differences seen among children in the CFC program in emergency and well child visit use by rurality, but none with the size and scope of the home health differences. As the majority of the increase in home health



TABLE 2 Yearly health use per 1,000 members by Medicaid program population and rurality

	CFC program			ABD program			AFK program					
	Urban	Large rural	Small rural	P-value	Urban	Large rural	Small rural	P-value	Urban	Large rural	Small rural	P-value
Total home health visits	72.62	28.89	19.83	<.001	6571.74	1297.82	949.19	<.001	1548.73	461.61	1148.17	.045
ED E&Ms	219.27	302.3	271.96	<.001	213.29	276.82	243.06	.091	133.12	116.68	109.08	.597
Inpatient	53.21	52.9	48.37	.091	75.19	64.83	65.53	.537	39.12	31.42	26.1	.461
Well child E&Ms	478.27	388.18	391.24	.046	299.14	219.73	213.84	.013	461.67	337.28	312.83	.331
Nonemergency transportation	9.24	10.64	10.49	.603	43.39	37.14	32.88	.741	27.34	17.6	11.09	.043
Emergency transportation	2.36	2.79	2.9	.041	7.63	8.3	6.82	.758	6.45	3.75	3.06	.065
Time period	2010-2019				2013-2019				2017-2019			

Abbreviations: ABD, aged, blind, and disabled program; AFK, adoptive, foster, and kinship care program; CFC, covered families and children program; ED, emergency department; E&M, evaluation and management visits.

One-way ANOVA tests for differences by rurality.

TABLE 3 Marginal yearly change in home health use per 1,000 members by Medicaid program population and rurality

	CFC program			ABD program			AFK program					
	Urban	Large rural	Small rural	P-value	Urban	Large rural	Small rural	P-value	Urban	Large rural	Small rural	P-value
Total home health visits	12.68***	0.95	0.54	0.54	791.40***	68.84	191.85	191.85	-407.25**	-27.48	-568.55**	
Home health aide visits	11.30***	0.67	0.49	0.49	637.62***	-13.60	75.95	75.95	-297.03*	-7.72	-399.15*	
Home health skilled nursing visits	1.38*	0.28	0.04	0.04	153.59***	82.29*	115.90**	115.90**	-109.33	-20.78	-169.40*	
Years included in model:	2010-2019				2013-2019				2017-2019			

Change in home health use with each additional year.

*P < .05, **P < .01, ***P < .001 for yearly trend in population.

Abbreviations: ABD, aged, blind, and disabled; AFK, adoptive, foster, and kinship care; CFC, covered families and children.

included home health aides, it could be that there is an overutilization of home health in urban communities or that the needed skill sets and services are not getting to children and families. Additionally, pediatric home health may not be as carefully focused upon or effective in reducing other types of care. This is contrary to specific studies examining its role in reducing or offsetting other expenditures; for example, Maynard and colleagues found favorable differences in emergent care and lengths of stay for children with medical complexity receiving home health care.² Instead, it may mean that routine home health care as administered in the community is not as effective as that implemented in prior research studies. Furthermore, for a segment of children with highest severity health concerns, it may be unreasonable to evaluate home health in terms of averting hospitalization or other costly health care utilization because the nature of their diagnoses is not associated with clear opportunities to avoid high-cost clinical events.

It could also mean that family care, or other sectors, may be providing offsetting services in rural areas or for some key conditions. The burden of family care providers, schools, and foster care for rural children with severe and complex conditions is well documented, and it is unclear how much extra burden families without home care take on daily. This possibility is particularly problematic given the already greater poverty relative to urban populations. We are unable to document participating in other waiver programs with these data, and thus it is possible that children are receiving home health care services that are not paid for through Medicaid managed care plans. In addition, this study's local populations or regional factors may preclude the generalizing of results found by Maynard or other investigators.

The value of home health care use may be seen from a societal perspective rather than solely through the managed care organization perspective. Home health care use could mean fewer missed days from parental work and school, as well as improved quality of life measures at the family level. These are outcomes not visible in administrative claims data. Home health care has important benefits outside of reducing other forms of medical expenditures. Educational or family quality of life measures may be necessary to show the value of these home health services.

In some cases, shifting the burden of medical care from family members to formal home health staff can be valuable as well. As we think about the social determinants of health and the impact of unemployment and poverty on a community, providing family caregivers the opportunity to shift from the informal care they provide to formal employment may lessen caregiver burnout as well as provide economic value to the family and the community. As Volpp and colleagues have discussed, many of the longer term benefits of home health are not currently financially incentivized but may also be important considerations in the use of home health as well as the payment model.¹³

The primary finding of this study, disparity of access to home health care services between rural and urban Medicaid-enrolled children, should inform state policies. Further work should be done to understand how changes in Medicare reimbursement to home health have changed home health agencies and the pediatric services that they provide. Telehealth services, which have long been promoted as a fix for restricted access to health care for those in rural regions, are likely

inadequate for solving all service needs in the home, especially with limited broadband in many areas like our Appalachian study area. Even with broadband access, remote monitoring may mitigate some of the deficiency for the assessment portion of home care service, but it would not meet the needs of those requiring physical assistance in caring for children. If the cost of providing in-home care differs so much between urban and rural regions of the state as to create disparities of access, an appropriate intervention would be to support higher reimbursement to counter the underlying cost differences. This could be done through a modifier for home care claims provided in a rural community, similar to the way reimbursements for physician services off-hours are paid at a premium relative to regular daytime working hours.

LIMITATIONS

There are several limitations to consider. First, this is a Medicaid ACO in one state; the largely Appalachian rural population may look very different than other rural populations. It is a population that is largely White, and factors affecting these communities may be very different from other rural communities. Moreover, we do not know about attitudes toward home visiting in our Appalachian communities. In addition, rural residence is not monolithic, and the geographic barriers in Northeast rural communities are likely different from the barriers affecting rural communities in the West or the South. As such, the study results from this paper may not be generalizable to other larger populations of children receiving home health services. However, this study adds to the limited literature on pediatric ACOs. Second, this is a claims-based study, and thus we do not know the true indications for home health care services. However, the rural and urban populations appear to be similar over the years. We also do not see much movement from rural to urban or urban to rural communities. In addition, as these are administrative claims data, we are unable to account for other home health services and support that are billed through other means, including the home health waiver program. However, the lengthy wait lists for these programs suggest that need is still greater than the availability of these services.

CONCLUSIONS

Home health use for Medicaid-enrolled children in this ACO varied markedly by rural and urban residence. Within the group most likely to use home health services, children enrolled in the ABD program, there were few differences in health care use associated with these large disparities in access to home health. ED visits and well child visits among children enrolled in the CFC program residing in urban communities were lower than their counterparts in rural communities. The lack of clear indication for use of home health care, the variable implementation of such services, and questions about the variety of benefits from such services limit the conclusions that can be drawn about the appropriateness of such a large rural-urban disparity in service provision.

Further evaluation is needed on the impacts of home health care use on poverty and unemployment rates, family burden, and quality of life.

CONFLICT OF INTEREST

Dr. Gleeson is the President of Partners for Kids. Dr. Liu is the Medical Director for Partners for Kids. Ms. Conkol is the Vice President of Care Coordination. Dr. Hardy's post-doctoral scientist position is partially funded by Partners for Kids.

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REFERENCES

1. Boss RD, Raisanen JC, Detwiler K, et al. Lived experience of pediatric home health care among families of children with medical complexity. *Clin Pediatr (Phila)*. 2020;59(2):178-187.
2. Maynard R, Christensen E, Cady R, et al. Home health care availability and discharge delays in children with medical complexity. *Pediatrics*. 2019;143(1):e20181951.
3. Berry JG, Hall M, Dumas H, et al. Pediatric hospital discharges to home health and postacute facility care: a national study. *JAMA Pediatr*. 2016;170(4):326-333.
4. Clemens CJ, Davis RL, Novack AH, Connell FA. Pediatric home health care in King County, Washington. *Pediatrics*. 1997;99(4):581-584.
5. Rural Home Health Services. <https://www.ruralhealthinfo.org/topics/home-health#rural-availability>. Published 2020. Accessed June 23, 2020.
6. Feudtner C, Feinstein JA, Zhong W, Hall M, Dai D. Pediatric complex chronic conditions classification system version 2: updated for ICD-10 and complex medical technology dependence and transplantation. *BMC Pediatr*. 2014;14:199.
7. Mroz TM, Patterson DG, Frogner BK. The impact of Medicare's rural add-on payments on supply of home health agencies serving rural counties. *Health Aff (Millwood)*. 2020;39(6):949-957.
8. Foster CC, Agrawal RK, Davis MM. Home health care for children with medical complexity: workforce gaps, policy, and future directions. *Health Aff (Millwood)*. 2019;38(6):987-993.
9. Simpser E, Hudak ML. Section on home care, committee on child health financing. Financing of pediatric home health care. *Pediatrics*. 2017;139(3):e20164202.
10. Graham J. Why Home Health Care is Suddenly Harder to Come by for Medicare Patients. Kaiser Health News. <https://khn.org/news/why-home-health-care-is-suddenly-harder-to-come-by-for-medicare-patients/>. Published 2020. Accessed June 24, 2020.
11. Landers S, Madigan E, Leff B, et al. The future of home health care: a strategic framework for optimizing value. *Home Health Care Manag Pract*. 2016;28(4):262-278.
12. Song PH, Xu WY, Chisolm DJ, et al. How does being part of a pediatric accountable care organization impact health service use for children with disabilities? *Health Serv Res*. 2019;54(5):1007-1015.
13. Volpp KG, Diamond SM, Shrank WH. Innovation in home care: time for a new payment model. *JAMA*. 2020;323(24):2474-2475.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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