Journal of Asthma and Allergy

Dovepress
Taylor & Francis Group

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ORIGINAL RESEARCH

Access to Pediatric Asthma Specialty Care: A Survey and Geospatial Analysis Across a Rural State

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Objective: Although children with asthma have improved outcomes when accessing asthma specialists (allergist/immunologists and pediatric pulmonologists), this care may not be available if no specialists are located nearby, or if nearby specialists do not accept children or a given child's insurance. We aimed to describe the physical proximity of children to pediatric asthma specialty care in a largely rural state and to assess the degree to which the availability of pediatric specialty asthma care was impacted by provider nonacceptance of pediatric patients and patients with Medicaid insurance.

Methods: We conducted a telephone survey of pediatric pulmonology and allergy/immunology practices in the rural state of Maine and adjacent areas during June and July 2024, asking whether they accepted pediatric patients, whether they accepted pediatric patients with Maine Medicaid insurance, and their wait times for new patient appointments. We assessed the association of acceptance policies and clinician specialty (allergy vs pulmonology), training (physician vs advanced practice provider), and state (Maine vs other) using Fisher's exact tests and we calculated the travel time to the nearest provider locations for children across Maine.

Results: Among 49 asthma specialists in and around Maine, 41 (84%) accepted pediatric patients. Eighty-nine percent of Maine providers and 6% of out-of-state providers accepted children with Maine Medicaid insurance. The median distance to any asthma specialist was 30.5 minutes (IQR 17.2, 51.0) and 18% of children would need to travel >60 minutes for care.

Conclusion: Nearly one in five children in Maine would be required to travel more than 60 minutes to reach an asthma specialist, nearly one in five allergy providers do not accept children, and few out of state providers accept Maine Medicaid insurance. Future research should assess the impacts of these barriers on children's receipt of care.

Plain Language Summary: In this study, the authors contacted the offices of asthma specialists in and around Maine to ask whether each specialist accepted children, and whether they accepted Maine Medicaid insurance. We tested whether patient acceptance policies differed by specialty, training, and location of the specialists. We also used census data to calculate the distance from all children in Maine to the nearest specialist. Of 49 pediatric asthma specialists in and around Maine, we found that only 41 (84%) accepted pediatric patients. Pediatric pulmonary specialists and in-state providers were more likely to accept children with Maine Medicaid insurance. Half of children would travel 30 or more minutes to reach the nearest specialist. This study raises concerns that children with Medicaid, especially along state borders, may have fewer options for needed asthma specialty care.

Keywords: pediatrics, barriers to care, rurality, insurance, disparities

Introduction

Asthma affects more than 5 million children, and nearly one in five children with asthma require asthma-related emergency or urgent care visits each year.[1,2] The burden of asthma can be significantly reduced through appropriate medical management, including pharmacotherapy and avoidance of asthma triggers.[3] Although most children receive

Received: 19 December 2024
Accepted: 13 March 2025
Published: 21 March 2025

asthma care in the primary care setting,[4] the National Heart, Lung, and Blood Institute recommends referral to specialty care for children with specific comorbidities or severe or difficult-to-treat asthma.[2] Receipt of care from asthma specialists (pediatric pulmonologists and allergist/immunologists) is associated with improved asthma outcomes, including fewer symptom days and hospitalizations.[5–7] However, access to pediatric specialty care in general,[8] and to pediatric pulmonologists and allergist/immunologists specifically,[9,10] may be hindered by the limited supply of specialists. Care may be particularly limited for the children with disabilities or from lower-income families who receive publicly funded Medicaid insurance, which is not accepted by many providers.[11,12] Care may also be more limited for children in rural areas since pediatric subspecialists are disproportionately located at academic centers in urban areas.[13]

Previous work describing the limitations of the current pediatric subspecialty workforce has used the distance from children around the United States to the nearest pediatric subspecialist as a proxy for geographic barriers to care.[13] However, this work did not account for specialists who provide care at multiple locations or for subspecialty care provided by nurse practitioners and physicians' assistants (collectively advanced practice providers, APPs). Further, non-geographic factors such as appointment availability and acceptance of a patient's health insurance may also be important in determining access.[14]

Understanding access to asthma specialty care may be more complex than for other pediatric conditions. Although pediatric pulmonologists, allergist-immunologists, and affiliated APPs all provide asthma specialty care, this does not necessarily mean they are equivalent sources of access. In particular, although allergist-immunologists are board certified to provide care for both children and adults, they might choose not to care for children or might have limited availability for children due to the competing needs of adult populations.[15] In this analysis, we surveyed asthma specialists in and around the rural state of Maine to determine their clinic locations and policies for seeing children and accepting Maine Medicaid insurance. We then calculated the travel time to asthma specialists for children around the state, with the aim of: 1) describing proximity to pediatric asthma care across a state with a large rural population and 2) determining the degree to which specialist nonacceptance of pediatric patients and patients with Medicaid insurance impacted the availability of pediatric asthma specialty care.

Materials and Methods

Setting

Maine is the second most rural of the United States,[16] and home to more than 22,000 children (8.5% of the child population) with current asthma. Prevalence rates are highest in the northern, rural areas of the state.[17] As of this writing Maine's asthma specialty workforce includes allergists in multiple practices, pediatric pulmonologists at one academic medical center, and APPs working with both kinds of physician specialists.

Study Design

This cross-sectional survey-based study was evaluated by the MaineHealth institutional review board (study #2031769) and determined not to be human subjects research and therefore exempt from informed consent. We identified locations of pulmonologists and allergist/immunologists based on listings available through the American Academy of Allergy, Asthma, and Immunology, supplemented by internet searches.[18] In addition to identifying all locations with asthma specialists in Maine, we identified locations with asthma specialists in other states which were nearer to at least one Maine ZIP code than were any asthma specialists in the state.

In June and July 2024, a study team member (DS) called front offices at each clinical location, identifying herself as a researcher and asking scripted survey questions. These included confirming the asthma specialists (pulmonologists, allergist-immunologists, and any advanced practice providers serving as asthma specialists) at the practice, determining all locations at which these clinicians provided care, inquiring about the youngest age of patient accepted by each provider, and whether the practice accepted children with MaineCare (Maine Medicaid) insurance. We specifically asked whether practices accepted MaineCare as opposed to Medicaid more generally because Medicaid reimbursement for services and acceptance by providers both vary state-to-state. We also asked about the current wait time for a new appointment for a child referred to the practice for management of asthma.

All analyses were performed in R v4.2.1.[19] We evaluated the association between specialty (allergy-immunology vs pulmonology), training (physician vs APP), and state (Maine vs other) and both acceptance of any pediatric patients and acceptance of children with Maine Medicaid using Fisher's exact tests. To calculate the distributions of travel times to specialists among the child population of Maine we used similar methods to a previous study.[20] We used the gmapsdistance package to calculate the Google Maps estimated driving time in minutes (without traffic) from each ZIP code tabulation area (ZCTA) centroid in Maine to the nearest location of asthma specialty care. We created child-population-level distributions of driving times by weighting the driving times of each ZCTA by the estimated child population within that ZCTA based on the 2020 census.[21] We calculated the median and interquartile range (IQR) of driving times to the nearest location of a pediatric asthma specialist, as well as to the nearest location at which at least one provider accepting children, and to the nearest location at which at least one provider accepted children with Maine Medicaid insurance. Because some children with asthma (including those with comorbidities, or those with need for allergy skin testing) might require care from an allergist or pulmonologist specifically, we repeated our analyses for each of these individual specialties.

Results

Providers in Maine

We identified medical offices of 18 pediatric asthma specialists within Maine: four pediatric pulmonologists with one pediatric pulmonary APP, and nine allergist/immunologists with four associated allergist/immunologist APPs in the state of Maine. Each identified practice was successfully contacted, and complete survey information was obtained. These specialists provided care at a total of 11 practice locations in Maine. Ten specialists (56%) provided care at one location, five (28%) provided care at two locations, and two (11%) provided care at three. Most providers (13, 72%) took pediatric patients of any age, while 3 (17%) only saw children over the age 2 years, one (6%) saw children only over the age of 12 years, and one (6%) did not accept any children under 18 years. Among the 17 providers who saw children, the median wait time for an appointment was 3 months and almost all (16, 94%) reported accepting children with Maine Medicaid insurance.

Providers in Neighboring States

We also identified 21 practices in neighboring states with practice locations that would be closer to one or more Maine ZIP codes than any practice locations in Maine. Each practice was successfully surveyed. We found that these practices housed 31 pediatric asthma specialists (28 allergist-immunologists and 3 associated APPs). Two of these specialists (6%) accepted only children over age 6 years, and six specialists (20%) did not accept any children. Among out-of-state providers accepting children, the median wait time for an appointment was 1 month and only two providers (6%) accepted children with Maine Medicaid insurance.

Table 1 describes the associations between specialty, training, and location and acceptance of any children and children with Maine Medicaid insurance. Pediatric pulmonologists and in-state providers were significantly more likely to accept children with Maine Medicaid insurance than allergists and out-of-state providers, respectively ($p=0.004$, and $p < 0.001$).

Drive Times

Table 2 and Figure 1 quantify and illustrates the locations of pediatric asthma specialty practices in and around Maine, as well as the drive time for children within the state to reach the nearest specialist. The median drive time from children in Maine to any asthma specialist was 30.5 minutes (IQR 17.2, 51.0) and the maximum time was 279 minutes. Eighteen percent of children were more than 60 minutes from any provider, and for seven percent of children the closest specialist was across a state line. Median drive times were similar when restricting only to specialists accepting children or only specialists accepting children with Medicaid insurance.

In considering specific specialties, the median drive time from children in Maine to an allergist-immunologist was 33.5 minutes (IQR 19.0, 51.7). Restricting to allergists who saw children did not change children's median travel times, but when restricting to allergist-immunologists accepting Maine Medicaid insurance the median time to reach the nearest provider increased to 40.2 minutes (IQR 24.6, 63.0), with 27.2% of children needing to travel more than 1 hour to receive

Table 1 Acceptance of Pediatric Patients and Maine Medicaid Among Asthma Specialists in and Around Maine

	N	Accepting Pediatric Patients		Accepting Maine Medicaid	
		N (%)	p	N (%)	p
Specialty					
- Pediatric Pulmonology	5	5 (100%)	0.58	5 (100%)	0.004
- Allergy-Immunology	44	36 (82%)		13 (32%)	
Training					
- Physician	41	33 (81%)	0.32	13 (63%)	0.124
- APP	8	8 (100%)		5 (63%)	
State					
- ME	18	17 (94%)	0.229	16 (88.9%)	<0.001
- Not ME	31	24 (77%)		2 (6%)	

Note: p values are based on Fisher's exact tests.
Abbreviations: APP, Advance practice provider; ME, Maine.

Table 2 Locations of Pediatric Asthma Specialty Care in Maine and Adjacent Areas, and Drive Time to Nearest Location for All Children in Maine (n = 207,409)

	Locations in Maine	Locations Outside of Maine	Drive Time to Nearest Location (Minutes)	Children Over 60 minutes from Any Location
	N	N	Median (IQR)	
All asthma specialists				
- All locations	11	21	30.5 (17.2, 51.0)	18.0%
- Locations accepting children	10	17	30.5 (18.4, 51.0)	18.0%
- Locations accepting children with Medicaid	8	2	34.7 (23.8, 52.2)	21.1%
Allergists				
- All locations	8	21	33.5 (19.0, 51.7)	18.2%
- Locations accepting children	7	17	33.5 (19.0, 51.7)	18.2%
- Locations accepting children with Medicaid	5	2	40.2 (24.6, 63.0)	27.2%
Pulmonologists				
- All locations	3	0	45.2 (29.3, 67.0)	30.8%
- Locations accepting children	3	0	45.2 (29.3, 67.0)	30.8%
- Locations accepting children with Medicaid	3	0	45.2 (29.3, 67.0)	30.8%

Notes: Drive time calculations estimate travel from the ZIP codes of home addresses of all children in Maine, based on the 2020 census. Because all pulmonologists were in Maine and accepted children with Maine Medicaid insurance, our counts and distances for pulmonologists match those of a previous study on distances to pediatric subspecialist outreach clinics.[20]
Abbreviation: IQR, Interquartile range.

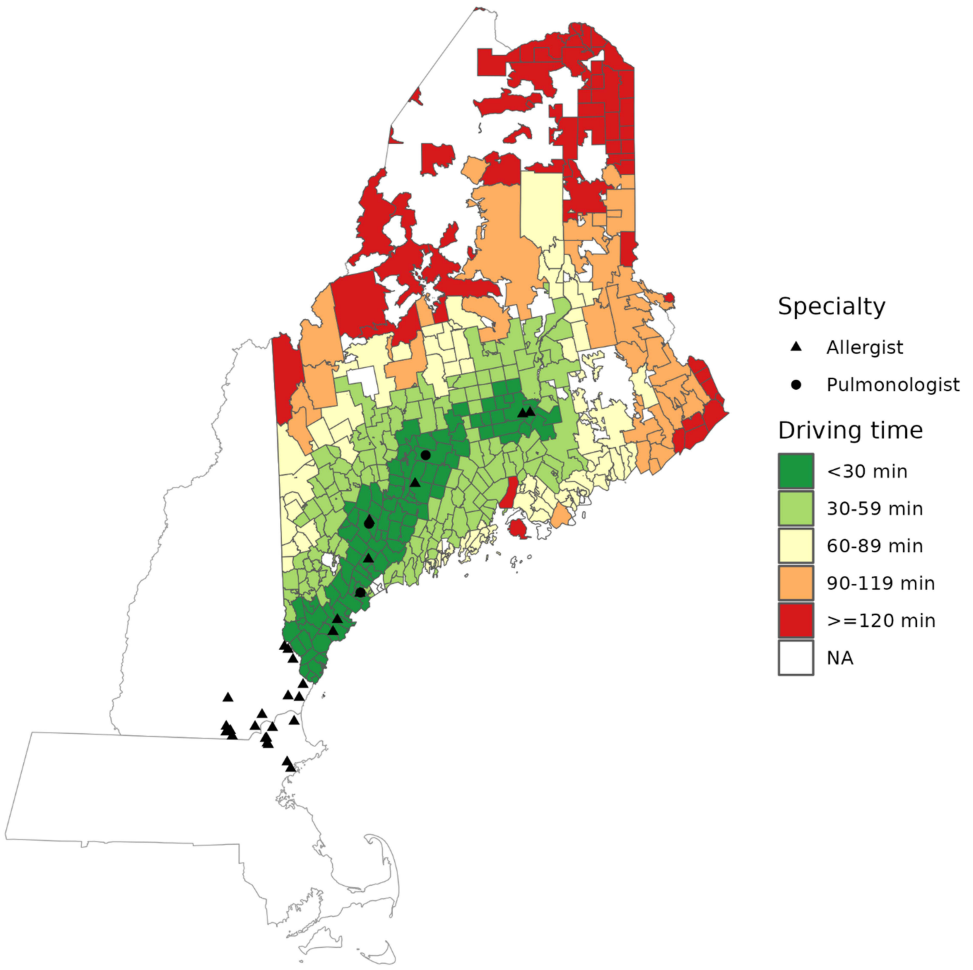

Figure 1 Minimum driving distance (minutes) to a pediatric asthma specialist for children in Maine. Shapes represent the locations of all allergist-immunologists, pediatric pulmonologists, and affiliated advanced practice providers in Maine, as well as all such locations in neighboring states which were closer to at least one Maine ZIP code tabulation area centroid than any specialist location in Maine. Coloration represents driving time to the nearest specialist location.

care. The median drive time from children in Maine to a pulmonologist was 45.2 minutes (29.3, 67.0), and all pulmonologists accepted children with Maine Medicaid insurance.

Discussion

In this assessment of pediatric asthma specialists in Maine, we found that the median travel time from children to the nearest provider was around 30 minutes, with eighteen percent of children travelling more than 60 minutes to reach a provider. This travel may represent significant direct and indirect costs to some families.[22] The degree to which these travel burdens discourage families from seeking care is unclear: although previous studies assessing whether travel time and distance impact subspecialty visit attendance have found mixed results,[23–26] these studies have all included populations with much shorter travel times (65% under 30 minutes) and distances (means from 8–17 miles). Although one might expect that the much larger travel times seen in rural settings would have a more significant impact on subspecialist utilization, this remains to be studied.

We found that almost all providers in the state saw children, and policies around seeing children or accepting patients with Medicaid insurance had only a limited impact on travel time. However, we did find that some allergy providers in the state and most outside of the state did not accept Maine Medicaid. This is consistent with the low and variable rates of Medicaid acceptance found previously among allergists, and recent research showing that children with Medicaid access asthma specialists less frequently.[11,12] Our finding that the majority of out-of-state providers did not accept Maine

https://doi.org/10.2147/JAA.S511581

Medicaid may be expected given that in Maine, as in many other states, Medicaid requires prior authorization for out-of-state care.[27] However, this brings to light an important barrier that has not been acknowledged by recent research that described the distance to pediatric specialists on a national level but did not consider state borders, treating in- and out-of-state providers as equally accessible.[13] Since in our sample only seven percent of children were located closer to an out-of-state than an in-state provider, relatively few children would be impacted by the unavailability of out-of state care, for at least some children with Medicaid in Maine, particularly those living close to the state's southern boundary or specifically requiring care from an allergist-immunologist, will have fewer options for asthma specialty care compared to commercially insured peers. In other states with more shared borders there are likely more children who would benefit from cross-border care and therefore a greater risk of disparities due to policies around insurance acceptance. Policy efforts to decrease these disparities might include addressing factors that contribute to provider non-acceptance of Medicaid[28] or supporting the asthma management skills of primary care providers.

Strengths and Limitations

This study had both strengths and limitations. We conceptualized access more broadly than other recent research[12,13] by considering primary and secondary locations of providers, appointment availability, acceptance of pediatric patients, and acceptance of children with public insurance. We also assessed the contributions of advanced practice providers, allergist-immunologists, and pediatric pulmonologists to the pediatric asthma specialty workforce. In aggregate, this data may provide a clearer picture of access to care as experienced by families of children with asthma than previous research. We did not measure all aspects of access, however, including reliance on public transportation or seasonal road conditions.

Other limitations included our reliance on practices' self-reported appointment availability and patient acceptance. While prior research has also taken this approach,[12] another study instead used a secret-shopper method with invented patients, finding that even some offices that reported accepting Medicaid in general refused invented Medicaid patients.[29] Our work may therefore overestimate access to care for children with Medicaid.

Finally, this study studied only one state at a single point in time. Some of our findings would likely vary in other settings, since acceptance of Medicaid insurance,[30] laws governing the practices of APPs,[31] and distributions of pediatric specialists[13] all vary by state. However, since the supply of both allergist/immunologists and pediatric pulmonologists is equally or more limited in many other rural states compared to Maine,[12,13,32] we expect that children in most rural states face similar or greater distances to care. In addition, since most other states have Medicaid policies that complicate the receipt of care across state lines[33] and many have more substantial borders with neighboring states. Therefore, although our results are specific to one state, they strongly suggest the potential for barriers to subspecialty care and insurance-based disparities in access to subspecialty care in other rural states.

Conclusions

Most asthma specialists in Maine and neighboring areas accept pediatric patients and have reasonable appointment wait times. However, nearly one in five children in Maine would be required to travel more than 60 minutes to reach an asthma specialist. Moreover, nearly one in five allergy providers do not accept children, and few out of state providers accept Maine Medicaid insurance. Future research is needed to assess the degree to which these limitations impact receipt of care and clinical outcomes among children with asthma.

Abbreviations

APP, Advance Practice Provider; IQR, Interquartile range; ME, Maine; ZCTA, ZIP code tabulation area.

Data Sharing Statement

Data on the location and acceptance policies of asthma specialists in Maine is available from the corresponding author by request. Data on the residences of children in Maine is available from the US census bureau.

Consent for Publication

On behalf of all authors, JB consents to publication of all materials included in this submission.

Acknowledgment

We thank Riley Lutz for contributing to the design of this study.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; contributed to drafting, revising or critically reviewing the article; have agreed on the journal to which the article has been submitted; gave final approval of the version to be published; and agree to take responsibility and to be accountable for all aspects of the work.

Funding

James Bohnhoff received support from the National Institutes of Health, (K12TR004384). Dana Schwartz was funded by a student research scholarship from Chest Medicine Associates. No funding source had any involvement in study design, data collection, analysis or interpretation of data.

Disclosure

The authors have no competing interests to disclose for this work.

References

1. Pate CA, Zahran HS, Qin X, Johnson C, Hummelman E, Malilay J. Asthma Surveillance - United States, 2006–2018. *MMWR Surveill Summ*. 2021;70(5):1–32. doi:10.15585/mmwr.ss7005a1
2. National Asthma Education and Prevention Program. Expert Panel Report 3 (EPR-3): guidelines for the diagnosis and management of Asthma-Summary Report 2007. *J Allergy Clin Immunol*. 2007;120(5 Suppl):S94–138. doi:10.1016/j.jaci.2007.09.043
3. Balkrishnan R, Norwood GJ, Anderson A. Outcomes and cost benefits associated with the introduction of inhaled corticosteroid therapy in a Medicaid population of asthmatic patients. *Clin Ther*. 1998;20(3):567–580. doi:10.1016/s0149-2918(98)80066-0
4. Warman KL, Silver EJ. Are inner-city children with asthma receiving specialty care as recommended in national asthma guidelines? *J Asthma*. 2018;55(5):517–524. doi:10.1080/02770903.2017.1350966
5. Schatz M, Zeiger RS, Mosen D, et al. Improved asthma outcomes from allergy specialist care: a population-based cross-sectional analysis. *J Allergy Clin Immunol*. 2005;116(6):1307–1313. doi:10.1016/j.jaci.2005.09.027
6. Backer V, Nepper-Christensen S, Nolte H. Quality of care in patients with asthma and rhinitis treated by respiratory specialists and primary care physicians: a 3-year randomized and prospective follow-up study. *Ann Allergy Asthma Immunol*. 2006;97(4):490–496. doi:10.1016/S1081-1206(10)60940-4
7. Storms B, Olden L, Nathan R, Bodman S. Effect of allergy specialist care on the quality of life in patients with asthma. *Ann Allergy Asthma Immunol*. 1995;75(6 Pt 1):491–494.
8. The Pediatric Subspecialty Workforce and Its Impact on Child Health and Well-Being. The National Academies of Sciences, Engineering, and Medicine. Available from: https://www.nationalacademies.org/our-work/the-pediatric-subspecialty-workforce-and-its-impact-on-child-health-and-well-being#:~:text=An%20ad%20hoc%20committee%20of%20the%20National%20Academies,of%20those%20trends%20on%20child%20health%20and%20well-being. Accessed May 19, 2023.
9. Noah TL, Tolleson-Rinehart S, Esther CR, Peterson-Carmichael SL, Davis SD, Moore PE. The future of pediatric pulmonology: a survey of division directors, assessment of current research funding, and discussion of workforce trends. *Pediatr Pulmonol*. 2020. doi:10.1002/ppul.25228
10. Marshall GD. The status of US allergy/immunology physicians in the 21st century: a report from the American Academy of Allergy, Asthma & Immunology Workforce Committee. *J Allergy Clin Immunol*. 2007;119(4):802–807. doi:10.1016/j.jaci.2007.01.040
11. Geissler KH, Shieh MS, Krishnan JA, Lindenauer PK, Ash AS, Goff SL. Health insurance type and outpatient specialist care among children with asthma. *JAMA Network Open*. 2024;7(6):e2417319. doi:10.1001/jamanetworkopen.2024.17319
12. Ho FO, Zheng C, Frazier M, Nimmagadda SR, Gupta RS, Bilaver LA. Geographic variability of Medicaid acceptance among allergists in the US. *Am J Manag Care*. 2024;30(8):374–379. doi:10.37765/ajmc.2024.89588
13. Turner A, Ricketts T, Leslie LK. Comparison of number and geographic distribution of pediatric subspecialists and patient proximity to specialized care in the US between 2003 and 2019. *JAMA Pediatr*. 2020;174(9):852–860. doi:10.1001/jamapediatrics.2020.1124
14. Levesque JF, Harris MF, Russell G. Patient-centred access to health care: conceptualising access at the interface of health systems and populations. *Int J Equity Health*. 2013;12:18. doi:10.1186/1475-9276-12-18
15. White K. Pediatric allergists struggle to meet growing patient demand. Morning Brew; 2023. Available from: https://www.healthcare-brew.com/stories/2023/02/15/pediatric-allergists-struggle. Accessed February 4, 2025.
16. Census Summary File 1, P2 Urban and Rural. United States Census Bureau; 2020. Available from: https://data.census.gov/. Accessed March 1, 2024.
17. Asthma in Maine. Maine Center for Disease Control and Prevention; 2013. Available from: https://www.maine.gov/dhhs/mecdc/population-health/mat/information-and-publications/2014%20Factsheets/Maine%20Asthma%20Fact%20Sheet%202013_Jan2014.pdf. Accessed March 18, 2025.

18. Find an Allergist/Immunologist. Available from: https://allergist.aaaai.org/find/. Accessed July 1, 2024.
19. R Core Team. R: a Language and Environment for Statistical Computing. R Foundation for Statistical Computing; 2023. Available from: https://www.r-project.org. Accessed August 29, 2024.
20. Bohnhoff JC, Cutler A, Hagenbuch S, Kurland K. Pediatric subspecialty outreach clinics: reach and impact on access to care. *BMC Pediatr*. 2024;24(1):519. doi:10.1186/s12887-024-04995-6
21. Cromartie J. Rural-urban commuting area codes; 2023. Available from: https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes.aspx. Accessed October 2, 2023.
22. Ray KN, Chari AV, Engberg J, Bertolet M, Mehrotra A. Opportunity costs of ambulatory medical care in the United States. *Am J Manag Care*. 2015;21(8):567–574.
23. Bohnhoff JC, Taormina JM, Ferrante L, Wolfson D, Ray KN. Unscheduled referrals and unattended appointments after pediatric subspecialty referral. *Pediatrics*. 2019;144(6). doi:10.1542/peds.2019-0545
24. Rea CJ, Toomey SL, Hauptman M, et al. Predictors of subspecialty appointment scheduling and completion for patients referred from a pediatric primary care clinic. *Clin Pediatr*. 2024;63(4):512–521. doi:10.1177/00099228231179673
25. Patel MP, Schettini P, O'Leary CP, Bosworth HB, Anderson JB, Shah KP. Closing the referral loop: an analysis of primary care referrals to specialists in a large health system. *J Gen Intern Med*. 2018;33(5):715–721. doi:10.1007/s11606-018-4392-z
26. Miller AJ, Chae E, Peterson E, Ko AB. Predictors of repeated "no-showing" to clinic appointments. *Am J Otolaryngol*. 2015;36(3):411–414. doi:10.1016/j.amjoto.2015.01.017
27. Covered Services & Benefits. State of Maine Department of Health and Human Services. Available from: https://www.maine.gov/dhhs/oms/mainecare-options/covered-services-benefits. Accessed February 7, 2025.
28. Tucker III J. Factors influencing physician participation in Medicaid in the USA. *Int J Soc Econ*. 2002;29:753–762. doi:10.1108/03068290210438068
29. Chaudhry SB, Armbrecht ES, Shin Y, et al. Pediatric access to dermatologists: Medicaid versus private insurance. *J Am Acad Dermatol*. 2013;68(5):738–748. doi:10.1016/j.jaad.2012.10.034
30. Paradise J. Data note: a large majority of physicians participate in Medicaid. Kaiser Family Foundation; 2017. Available from: https://www.kff.org/medicaid/issue-brief/data-note-a-large-majority-of-physicians-participate-in-medicaid/#:~:text=The%20percentage%20of%20physicians%20accepting%20new%20Medicaid%20patients,the%20District%20of%20Columbia%20to%2095%25%20in%20Illinois. Accessed September 18, 2024.
31. Sarzynski E, Barry H. Current evidence and controversies: advanced practice providers in healthcare. *Am J Manag Care*. 2019;25(8):366–368.
32. Distance to Provider Dashboard by State. The American Board of Pediatrics; 2022. Available from: https://public.tableau.com/app/profile/americanboardofpediatrics/viz/DistancetoProviderDashboardbyState/StatebyState-DistancetoProvider?StateParameter=Maine&Specialty=Allergy%20and%20Immunology. Accessed December 10, 2024.
33. Medicaid Payment Policy for Out-of-State Hospital Services. Medicaid and CHIP Payment and Access Commission; 2020. Available from: https://www.macpac.gov/wp-content/uploads/2020/01/Medicaid-Payment-Policy-for-Out-of-State-Hospital-Services.pdf. Accessed February 7, 2025.