

Abstract

- Recent years have seen a significant increase in the use of telemedicine, which has reduced barriers to healthcare access. Nevertheless, concerns are rising regarding remote diagnosis due to the absence of or inefficient physical examination.
- Otitis media is a common childhood infection that requires a proper physical examination to determine the appropriateness of an antibiotic prescription.
- To evaluate antibiotic prescribing rates for otitis media management in telemedicine visits vs in-person visits, we conducted a retrospective cohort study using Medicaid claims data between January 2021 and December 2021 to identify children under 18 years of age who had a diagnosis of otitis media.
- Telemedicine visits had a higher antibiotic prescription rate when compared with in-person visits (OR=1.3 CI: (1.1-1.6), $p=0.005$). This finding can inform clinicians and the public regarding the prudent utilization of antibiotics.

Introduction and Research Question

- Otitis media (OM), refers to an infection of the middle ear caused by bacteria or viruses.¹ It is a prevalent childhood infection, affecting around 60% of children before reaching the age of 3 years, with 24% having experienced at least 3 episodes.²
- OM represents one of the leading causes of antibiotic prescription and usage in children for which a proper physical examination is needed to determine treatment benefits from antibiotics.³ Antibiotic overuse can lead to increased healthcare costs, side effects, bacterial resistance, and microbiome imbalance⁴
- In recent years, telemedicine has significantly skyrocketed the use of antibiotics in pediatric otitis media due to the absence/inefficient physical examination before prescription.
- We hypothesize that telemedicine visits for otitis media are more likely to result in antibiotic prescribing for which most of the prescriptions are inappropriate when compared with clinic/in-person visits.

Methods

- We analyzed Medicaid claims and CHIP data from January to December 2021 to find children under 18 diagnosed with otitis media during either telehealth or in-person appointments.
- We excluded children with other bacterial diagnoses needing antibiotics, those who got antibiotics in the last 30 days, those prescribed antibiotics from both telemedicine and clinic visits, and those with multiple otitis visits.
- In total, 456,308 children were part of the study: 402 were exclusively seen via telemedicine, and 455,906 were exclusively seen via in-person visits.
- Telemedicine visit prescription rates were compared with those from clinic visits as well as the antibiotic prescription appropriateness and duration by physicians in telemedicine visits vs clinic visits.

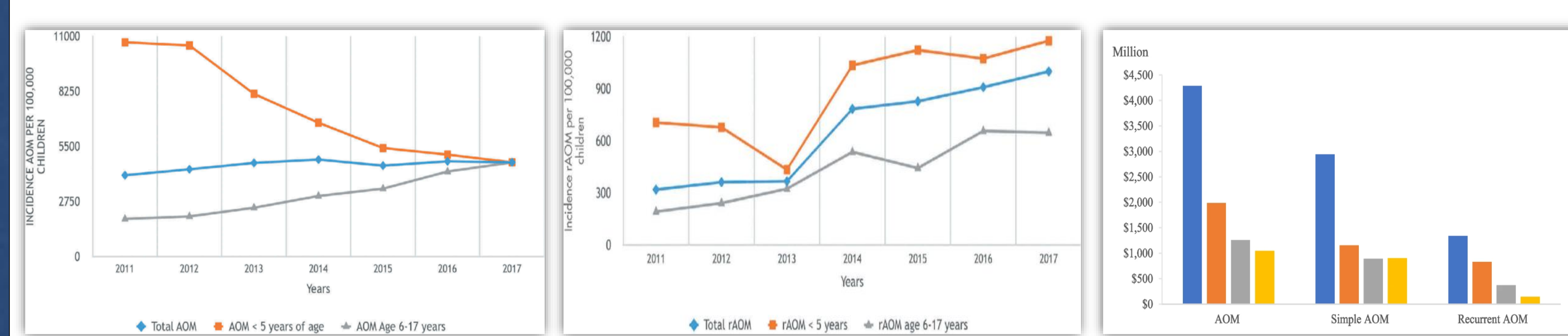


Figure 1: Trends in incidence of Acute Otitis Media with respect to age groups and years.

Figure 2: Trends in incidence of Recurrent Acute Otitis Media with respect to age groups and years.

Figure 3: National estimates of mean annual healthcare costs (in millions) of otitis media in children aged < 18 years in the United States (2014–2018)

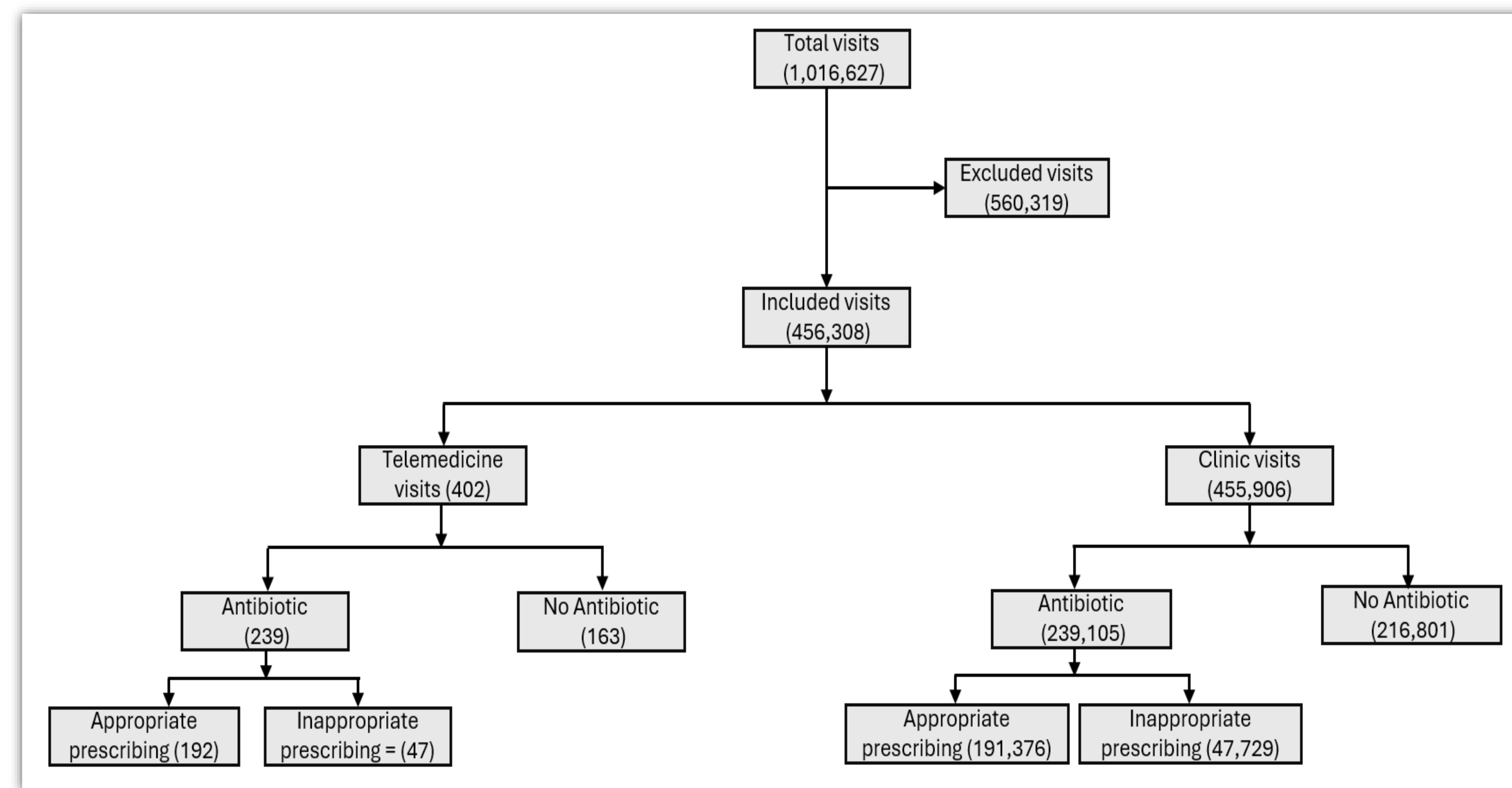


Figure 4: Visits and antibiotic prescribing for children 18 years and older, diagnosed with otitis media between January 2021 and December 2021

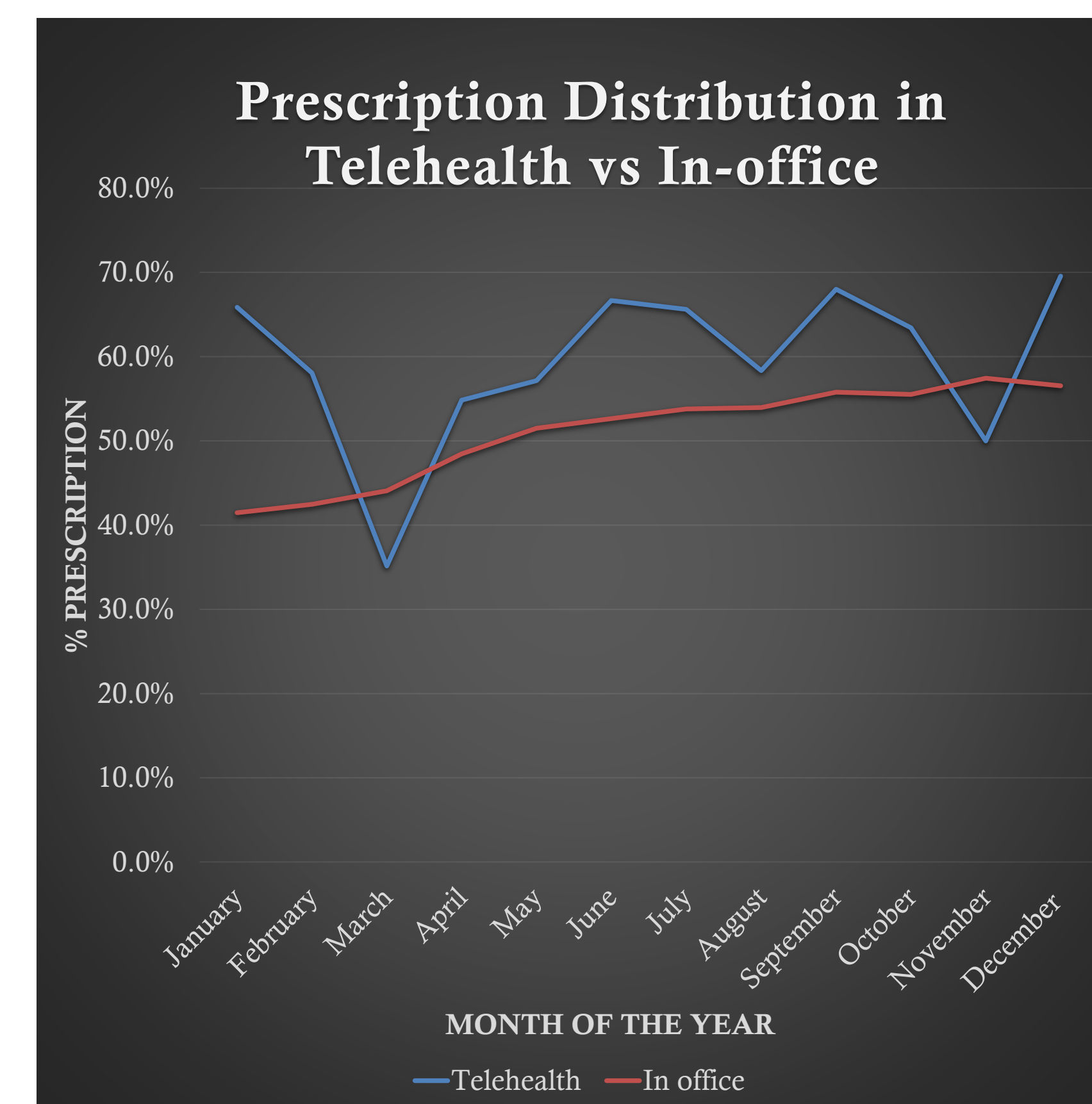


Figure 5: Distribution of antibiotic prescribing for children 18 years and older, diagnosed with otitis media over a period of 1 year (January 2021 and December 2021)

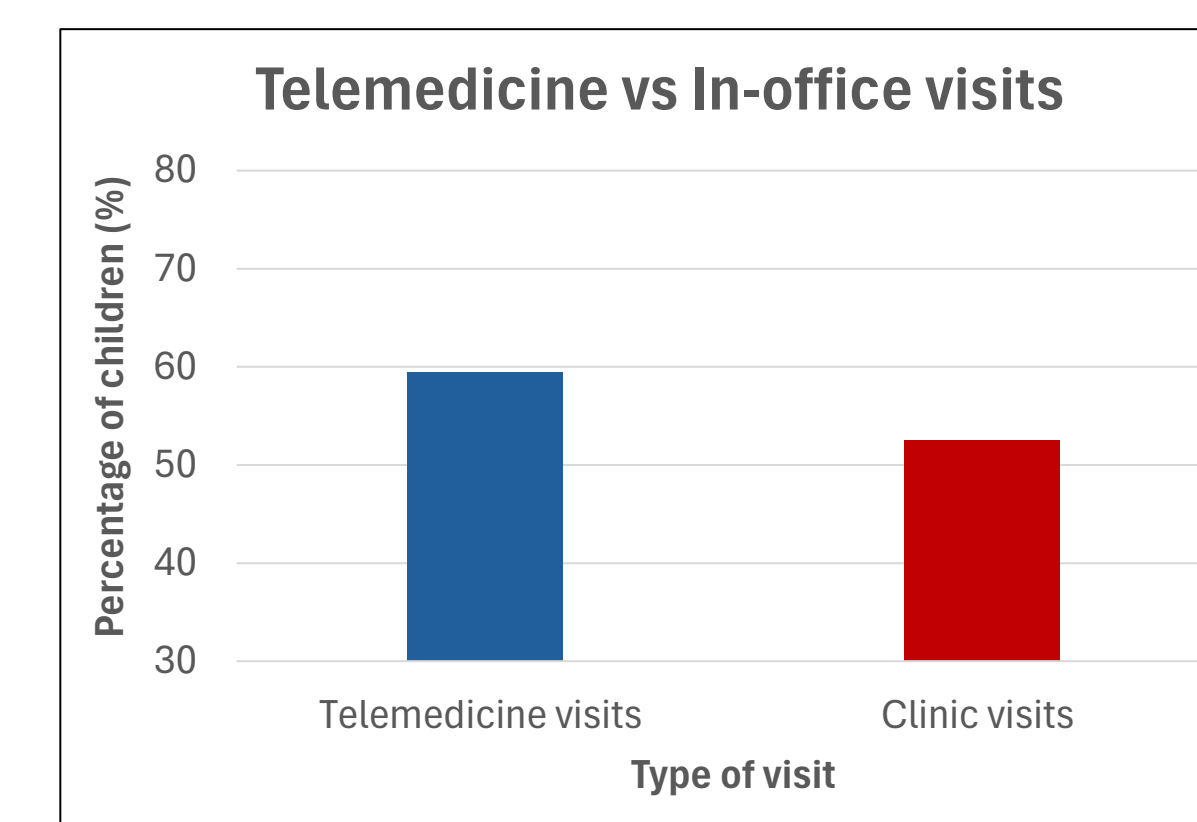


Figure 6: Total telemedicine visits vs in-office visits

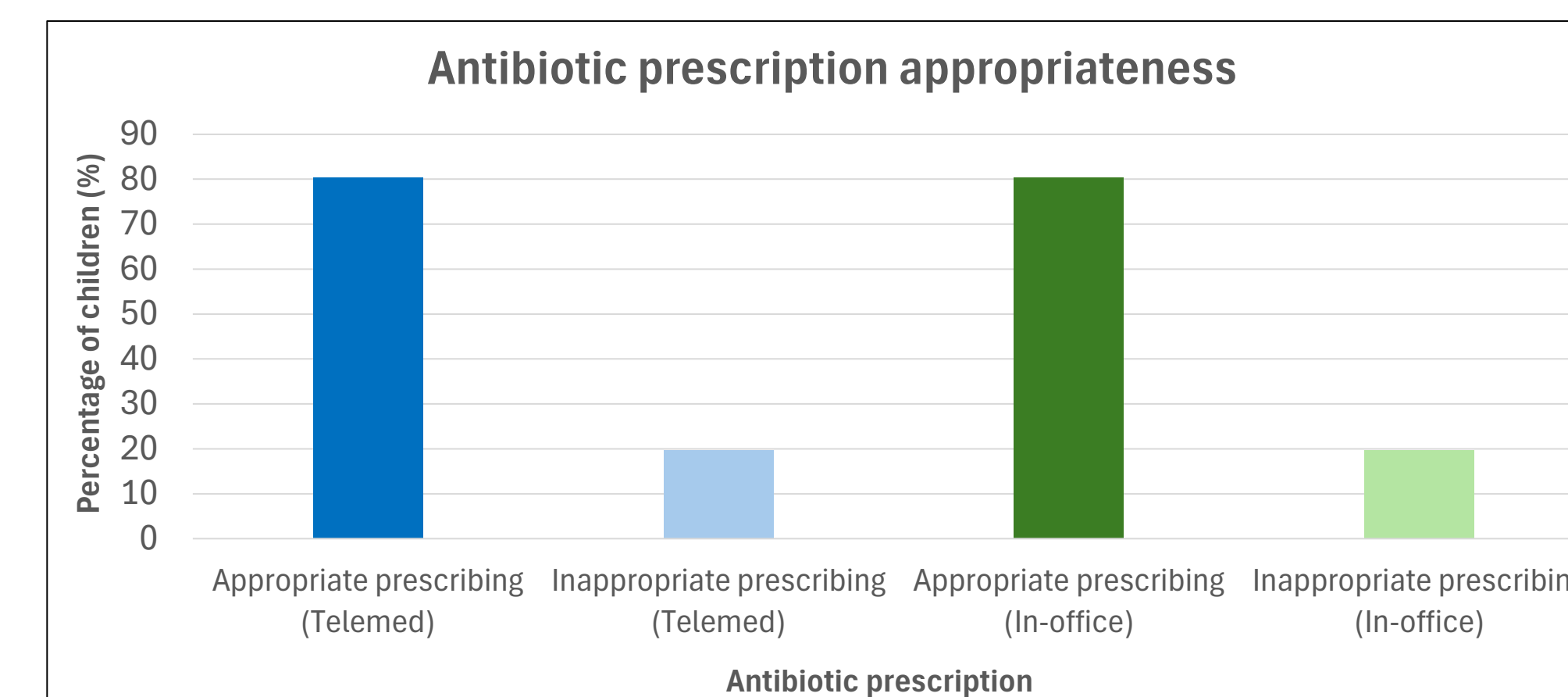


Figure 7: Antibiotic prescription appropriateness in telemedicine vs in-office visits

Results and Conclusion

Results

- Antibiotic prescribing in telemedicine visits was 59.5%, compared to 52.5% for in-person visits ($p=0.005$). This suggests that healthcare providers may be more inclined to prescribe antibiotics during telemedicine consultations, possibly due to factors such as no/limited physical examination capabilities.
- Children evaluated by telemedicine visits were more likely to be prescribed an antibiotic than children evaluated in in-person visits (OR=1.3 CI: (1.1-1.6)). This highlights the difference in prescribing behaviors between telemedicine and traditional in-person visits, which could have implications for antibiotic stewardship efforts.
- 80% of the children who were prescribed antibiotics met the appropriateness criteria (telemedicine=192, in-person=191,376, $p=0.91$). Suggesting telemedicine consultations may result in more frequent antibiotic prescriptions, but the appropriateness of those prescriptions remains comparable to in-person visits.

Conclusion

- Our study found a higher rate of antibiotic prescribing in telemedicine visits compared to in-person visits. These findings underscore the importance of considering the impact of telemedicine on antibiotic prescribing practices.
- Increased antibiotic use, particularly when unnecessary or inappropriate, can hugely contribute to antibiotic resistance and other adverse outcomes such as alterations to the microbiome, associated with the development of chronic diseases.
- These results may inform clinicians and the public about the need for judicious antibiotic use, especially in the context of telemedicine consultations. This finding holds the potential to inform the medical professions and the public regarding the prudent utilization of antibiotics.

Future Work

- Evaluate antibiotic resistance trends and microbiome alterations in children with a history of otitis media and antibiotic use. This may assess any associations with prescribing practices over time.
- Conduct cost-effectiveness analyses to compare the economic implications of antibiotic prescribing practices in telemedicine versus traditional in-person visits.
- Conduct a qualitative study on healthcare providers to explore the reasons behind the observed differences in antibiotic prescribing rates between telemedicine and in-person visits.

References

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