

Research

Cite this article: Heward E, Collingwood A, Jeffry F, Agrawal S, Jayaram S, Ashcroft DR, Hay AD, Nichani JR, Bruce IA. (2026) Referral and management patterns for paediatric otorrhoea across primary and secondary care: a multicentre retrospective cohort study. *Primary Health Care Research & Development* 27(e64): 1–5. doi: [10.1017/S1463423626101297](https://doi.org/10.1017/S1463423626101297)

Received: 27 October 2025

Revised: 3 February 2026

Accepted: 28 April 2026

Keywords:

bacteriology; chronic otitis media; health services research; otitis media; primary care

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Referral and management patterns for paediatric otorrhoea across primary and secondary care: a multicentre retrospective cohort study

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Abstract

Aim: To determine the frequency and nature of referrals for children with acute or chronic otorrhoea from primary care to secondary care ENT services in the UK. **Background:** Middle ear infections in children are common; if the ear drum bursts discharge leaks out (otorrhoea). This causes hearing loss during a critical developmental period. Managing these children in an appropriate time frame to prevent disease repercussions is vital. There is currently no evidence demonstrating referral patterns and management strategies across primary and secondary care services. **Method:** Children with otorrhoea were identified amongst a cohort of 2,100 paediatric ENT (age 0–16 years) referrals from primary care at two secondary care hospital trusts in England in 2023. Chi-squared statistical analysis was performed to compare referral urgency for those with or without hearing loss. **Findings:** Of the paediatric ENT referrals, 228 (10.9%) had otorrhoea (mean age: 6.4 years, female: $n = 110$). The most frequent symptom duration at time of referral was >3–6 months (21.1%). Children with hearing loss were not referred more urgently compared to those without reported hearing loss (28.1% vs. 29.4%, $p = 0.832$). Antibiotic use in primary care was predominantly using oral antibiotics compared to topical antibiotics in secondary care. This study has shown that children with otorrhoea make up a significant proportion of paediatric referrals to the ENT secondary care services in the UK. Current management is heterogenous and could contribute to treatment failure. Standardized management pathways for these patients should be formulated.

Introduction

Middle ear infections are common in children with 80% experiencing an infection before the age of three (Khairkar *et al.*, 2023). Middle ear infections will cause discharge (otorrhoea) if the tympanic membrane bursts or in the presence of a pre-existing perforation. The terminology for paediatric otorrhoea has recently been outlined (Heward *et al.*, 2025a). Acute ear discharge lasting up to 6 weeks is called acute otitis media with discharge (AOMd). Discharge lasting past this time point is called chronic suppurative otitis media (CSOM). Approximately 41,000 primary care appointments are required in the UK each year to manage children with AOMd or CSOM (Heward *et al.*, 2025b).

Paediatric AOMd and CSOM can cause both temporary and permanent hearing loss which can lead to developmental delay (Khairkar *et al.*, 2023). Other repercussions include child suffering, discomfort, social stigmatism due to cleanliness and financial cost to families (Heward *et al.*, 2024). Infection can spread to extracranial, intratemporal, and intracranial spaces, with these diagnoses prompting urgent admission to hospital via the emergency department.

Management of children with otorrhoea can be challenging. Primary care clinicians have described using the National Institute of Health and Care Excellence (NICE) guidance as their main management guide (Heward *et al.*, 2024). NICE suggests treating AOMd with oral antibiotics (NICE, 2022a). NICE CSOM guidance recommends not attempting treatment, but to refer patients to secondary care. It defines CSOM as otorrhoea duration for greater than 2 weeks (NICE, 2022b). Parents have highlighted concerns about heterogenous treatment strategies and conflicting advice (Heward *et al.*, 2024). Understandably, these conflicting guidelines cause clinician confusion.

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Research is required to help standardize treatment guidelines. Before this is possible, we must understand the current landscape across primary and secondary care. This study aims to determine the referral frequency and management practice for children with AOMd and CSOM across primary and secondary care in the UK.

Methods

The SQUIRE 2.0 framework was used for reporting this quality improvement project (Ogrinc *et al.*, 2016). A retrospective cohort study was performed at two secondary care hospital trusts in England, to identify all routine and urgent paediatric Ear, Nose, and Throat (ENT) outpatient referrals (age 0–16 years) from primary care from 1st January 2023 to 31st December 2023. Emergency admissions were not included. Patients with AOMd or CSOM were identified by reviewing the referral letter to identify whether otorrhoea was described. Referrals were reviewed for demographics, symptom duration, hearing loss, and prior management. The records from the patient's first secondary care ENT appointment were then reviewed. Data that could not be retrieved was classed as missing data. Data was stored on excel on the respective NHS trust secure networks. Patient details were anonymized once data was collected.

The patient population that centre A and centre B serve is 670,000 and 395,000 people, respectively. Centre A received 1,096 and centre B 1,004 referrals during the study duration. Prolonged antibiotic course was defined as greater than two weeks duration.

Chi-squared statistical analysis was used to compare referral urgency by hearing loss (GraphPad 2024). This non-parametric test was selected to compare observed frequencies of two categorical variables in a two-by-two contingency table. It was also chosen due to the large sample number. Significant difference was defined as $p < 0.05$. Descriptive analysis was performed for all other data. Research ethics approval was not required according to the Health Research Authority. The study was registered with the audit departments at both hospitals.

Results

In total, 2,100 paediatric ENT referrals were received across both sites of which 228 (10.8%) had AOMd or CSOM (Table 1). Duration of symptoms ranged from <3 days to over 2 years at time of referral from primary to secondary care (Figure 1). Half of the patients were referred with perceived hearing loss. Referrals of children with AOMd or CSOM were marked as urgent by the GP in 28.1% ($n = 64$) of cases. Patients with hearing loss were not referred more urgently than those without hearing loss (28.1% vs. 29.4%, chi squared: 0.045, $p = 0.832$). The most frequent treatment children received prior to the secondary care referral was multiple courses of oral antibiotics ($n = 86$, 37.7%) (Figure 2).

At the patient's initial ENT appointment, the most frequent prescription was for topical antibiotics ($n = 71$, 31.1%) followed by a prolonged course of oral antibiotics ($n = 47$, 20.6%) (Figure 3). A large proportion of patients ($n = 87$, 38.2%) had no medication prescribed. The majority ($n = 135$, 59.2%) of patients were provided with a follow-up appointment (Figure 4). Thirteen patients were listed for surgery (5 grommets, 3 adenotonsillectomy with grommets, 1 adenotonsillectomy, 3 examination under anaesthetic, and 1 myringoplasty).

Table 1. Patient demographics comparing all referrals to ENT versus those referred with otorrhoea

	All referrals	Referred with otorrhoea
<i>n</i>	2,100	228
Mean age (years)(range)	7.1 (0–16)	6.4 (0–16)
Female	973 (46.3%)	110 (48.2%)
Hearing loss at referral		
Yes	–	114 (50.0%)
No	–	109 (47.8%)
Missing data	–	5 (2.2%)

Discussion

In 2017/2018, GPs in England made 900,000 adult and paediatric ENT referrals (NHS, 2019). This study has identified that 10.8% of paediatric ENT referrals from primary care were for children with AOMd or CSOM. Therefore, using the population ratio for adults and children in England in 2022, it can be approximated that 12,000 children are referred to secondary care services with otorrhoea each year (ONS, 2024). This demonstrates significant burden placed on secondary care services and the scale of initial treatment failure in primary care.

Otorrhoea duration at time of referral is variable. It is concerning that children are suffering with months of otorrhoea, potentially impacting hearing and development, before being referred. Children with persistent otorrhoea despite adequate medical management should be reviewed by ENT to rule out a cholesteatoma. Prolonged otorrhoea duration at referral could be explained by late presentation to primary care, unclear referral and treatment guidance, and a drive to reduce secondary care referrals (NHS, 2019). Families of children with otorrhoea have demonstrated high levels of health seeking behaviour due to parental concern, which makes delayed presentation less likely (Heward *et al.*, 2024). In addition, in England under half of patients (49.2%) are being seen in secondary care ENT clinics within 18 weeks of referral, further delaying patient care (NHS, 2024). These cumulative factors result in management delay and increase the risk of permanent sequelae from ear infections.

Conductive hearing loss secondary to middle ear infections often occurs when children are in a key developmental period (NIDCD, 2022). It is postulated that toxins associated with middle ear infection can diffuse through the round window, potentially causing permanent cochlea damage (sensorineural hearing loss) (Dobrianskyj *et al.*, 2017). It is unclear how frequently middle ear infection causes sensorineural hearing loss and the long-term repercussions (Elzinga *et al.*, 2011). This research has identified that half of children referred with AOMd or CSOM had suspected hearing loss; with 28.1% being referred to secondary care urgently. Interestingly, only 10.1% of children underwent an age-appropriate hearing test in secondary care (Figure 3). Reasons could include resolution of symptoms, lack of access to paediatric audiology or reluctance to test while otorrhoea is present. The results of this study suggest that hearing loss is not prioritized by GPs or ENT. In children it can be difficult to determine if unilateral hearing loss is present as children will compensate using their contralateral normal hearing ear. Future research is needed to examine the short- and long-term impact on hearing and development.

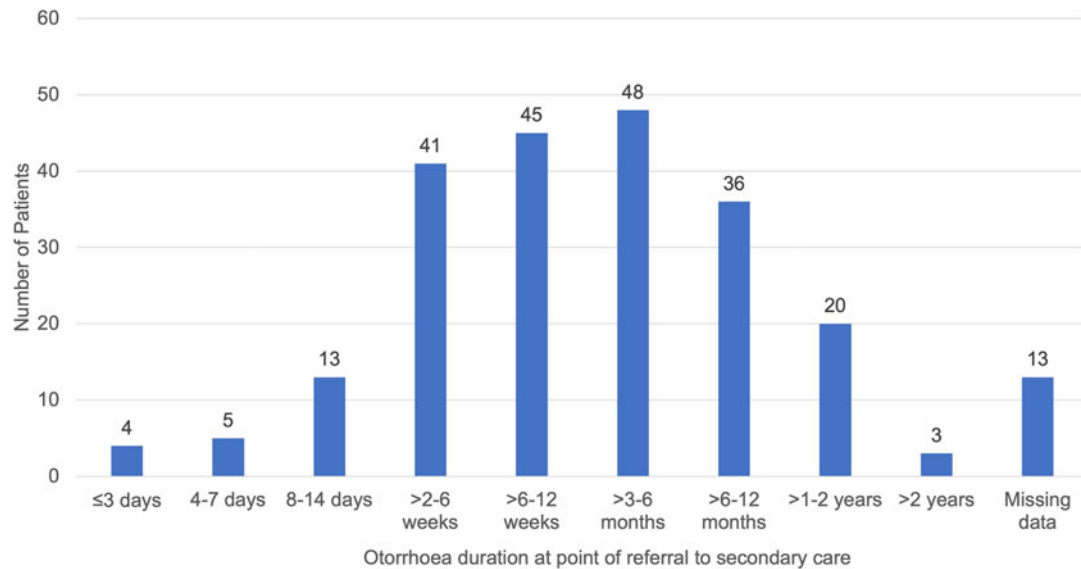


Figure 1. Symptom duration prior to secondary care referral.

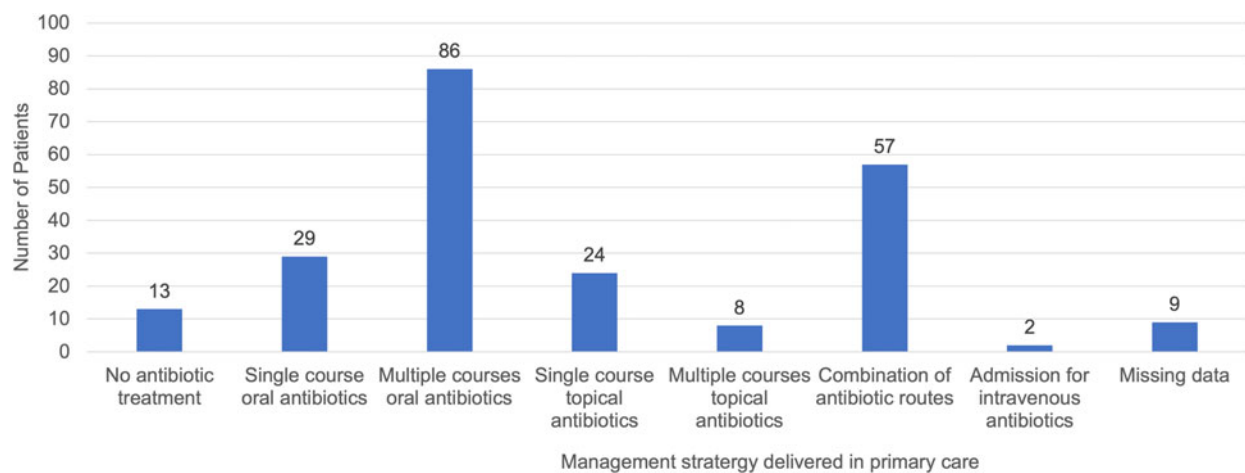


Figure 2. Antibiotic treatment delivered in primary care prior to secondary care referral.

Globally, there is increasing concern about antibiotic overuse and antimicrobial resistance (AMR) (GOV, 2024). Previous work has shown that children with AOMd are predominantly managed with oral antibiotics in primary care (Heward *et al.*, 2025b). The current study has demonstrated a higher frequency of oral antibiotic use compared to that in the literature (75.4% current vs 57.1%) (Heward *et al.*, 2025b). This is due to an inherent selection bias because all included patients in our study required a secondary care referral suggesting infections refractory to standard treatment. Very few children were referred to secondary care without preceding antibiotic management.

There is currently no evidence outlining secondary care management of children with otorrhoea. Our results demonstrate variable management strategies including the use of topical or long-term oral antibiotics. Interestingly, 38.2% received no medication at their first secondary care appointment. This could be due to symptom resolution prior to review or subsequent treatment in primary care whilst awaiting secondary care review. The heterogeneous antibiotic use seen in primary and secondary care

settings mandates further research to help develop a standardized approach.

The majority of patients were arranged follow-up appointments after their initial secondary care review demonstrating the challenge in managing this patient population. Parental concern is known to influence the clinician's decision-making (Heward *et al.*, 2024).

There are limitations to this retrospective study such as the missing data which will skew the results. There is also likely to be regional variation in practice which will not be reflected in this work. Interestingly, there is a large difference between the ratio of paediatric ENT referrals to secondary care and the total population served comparing both centres in this study. Reasons could include the local age group mix, referral practices, access to secondary care services, access to GPs with specialist interest in ENT and local commissioning. Within our patient cohort, it was not possible to identify if the total symptom duration consisted of continuous or recurrent episodes of otorrhoea. Children could potentially have numerous shorter episodes which do respond well to treatment,

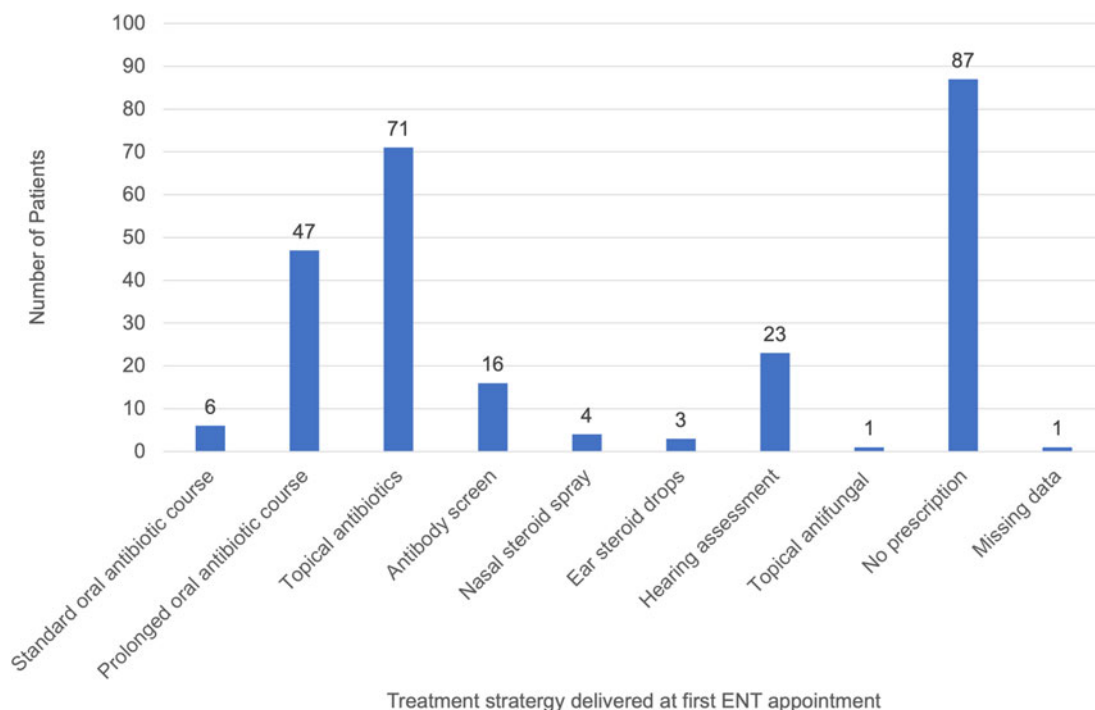


Figure 3. Management strategy at initial secondary care ENT appointment.

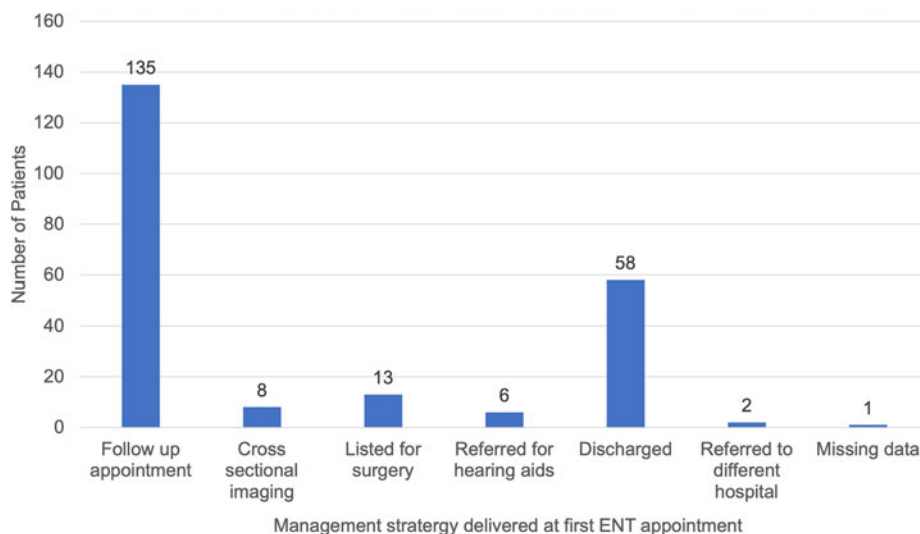


Figure 4. Management plan following initial secondary care ENT appointment.

but when referred the total duration of symptoms is outlined. The content of referrals was variable due to the free text nature of the referral templates. To enhance the data quality and to aid clinic prioritization electronic referral forms requiring key clinical information to be populated should be designed.

Conclusion

Children with AOMd and CSOM make up over 10% of paediatric referrals to the ENT secondary care services, approximately 12,000 each year in England. The duration of symptoms at referral and management strategies in primary and secondary care are variable. A collaborative approach by primary and secondary care services is

required to develop standardized clinical data collection and treatment pathways based on high level evidence.

Data availability statement. Data is available upon request to the corresponding author via email.

Author contributions. **Elliot Heward:** conceptualization (lead); methodology (lead); writing – original draft (lead); formal analysis (lead); writing – review and editing (equal). **Alex Collingwood:** data curation (equal); project administration (equal); writing – review and editing (equal). **Farah Jeffry:** data curation (equal); project administration (equal); writing – review and editing (equal). **Shailesh Agrawal:** conceptualization (supporting); writing – review and editing (equal). **Sharan Jayaram:** conceptualization (supporting); writing – review and editing (equal). **Darren M Ashcroft:** conceptualization

(supporting); writing – review and editing (equal). **Alastair D Hay**: conceptualization (supporting); writing – review and editing (equal); supervision (equal). **Jaya R Nichani**: conceptualization (supporting); writing – review and editing (equal); supervision (equal). **Iain A Bruce**: conceptualization (supporting); writing – review and editing (equal), supervision (equal).

Funding statement. None.

Competing interests. None.

Ethical standards. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional guidelines on human experimentation (Health Research Authority) and with the Helsinki Declaration of 1975, as revised in 2008.

References

- Dobrianskyj FM, Gonçalves Í.R D, Tamaoki Y, Mitre EI and Quintanilha Ribeiro FA** (2017) Correlation between sensorineural hearing loss and chronic otorrhea. *Ear, Nose & Throat Journal* **96**, E43–E46.
- Elzinga HBE, van Oorschot HD, Stegeman I and Smit AL** (2011) Relation between otitis media and sensorineural hearing loss: A systematic review. *BMJ Open* **11**, e050108.
- Government of the United Kingdom** (2024) Confronting antimicrobial resistance 2024 to 2029. [Online]. Available at <https://www.gov.uk/government/publications/uk-5-year-action-plan-for-antimicrobial-resistance-2024-to-2029/confronting-antimicrobial-resistance-2024-to-2029> (accessed 15 October 2025).
- Heward E, Birkenshaw-Dempsey J, McGovarin A, Molloy J, Wilbourn M, Sivayoham E, et al.** (2025a) Defining the terminology for acute ear discharge in children: Systematic review and expert consensus using the nominal group technique. *Clinical Otolaryngology*.
- Heward E, Domzaridou E, Gavan SP, Carr M, Lunn J, Molloy J, Isba R, Hay AD, Nichani JR, Bruce IA and Ashcroft DM** (2025b) Incidence, antimicrobial prescribing practice, and associated healthcare costs of paediatric otorrhoea in primary care in the UK: A longitudinal population study. *British Journal of General Practice* **75**, e113–e121.
- Heward E, Lunn J, Birkenshaw-Dempsey J, Molloy J, Isba R, Ashcroft DM, Hay AD, Nichani JR and Bruce IA.** (2024) Exploring the burden of paediatric acute otitis media with discharge in the UK: A qualitative study. *BMJ Paediatrics Open* **8**, e003012.
- Khairkar M, Deshmukh P, Maity H and Deotale V** (2023) Chronic suppurative otitis media: A comprehensive review of epidemiology, pathogenesis, microbiology, and complications. *Cureus* **15**, e43729.
- National Health Service England** (2019) Transforming elective care services ears, nose and throat (ENT). [Online]. Available at <https://www.england.nhs.uk/wp-content/uploads/2019/04/ear-nose-throat-elective-care-handbook.pdf> (accessed 15 October 2025).
- National Health Service England** (2024) NHS Referral to treatment (RTT) waiting times data. [Online]. Available at <https://www.england.nhs.uk/statistics/wp-content/uploads/sites/2/2024/04/Feb24-RTT-SPN-Publication-PDF-only-445KB-08666.pdf> (accessed 15 October 2025).
- National Institute of Health and Care Excellence** (2022a) Otitis Media (acute): Antimicrobial prescribing. [Online]. Available at <https://www.nice.org.uk/guidance/NG91> (accessed 15 October 2025).
- National Institute of Health and Care Excellence** (2022b) Scenario: Management of chronic suppurative otitis media. [Online]. Available at <https://cks.nice.org.uk/topics/otitis-media-chronic-suppurative/management/management/> (accessed 15 October 2025).
- National Institute on Deafness and Other Communication Disorders** (2022) Speech and Language Developmental Milestones. [Online]. Available at <https://www.nidcd.nih.gov/health/speech-and-language#> (accessed 15 October 2025).
- Office for National Statistics** (2024) Population estimates for the UK, England, Wales, Scotland, and Northern Ireland: Mid-2022. [Online]. Available at <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2022> (accessed 15 October 2025).
- Ogrinc G, Davies L, Goodman D, Batalden P, Davidoff F and Stevens D** (2016) SQUIRE. 2.0 (Standards for Quality Improvement Reporting Excellence): Revised publication guidelines from a detailed consensus process. *BMJ Quality & Safety* **25**(12), 986–992.