

Evaluation of distribution and revisit rates of pediatric otorhinolaryngologic diseases visits to emergency department and outpatient clinics

[™]Yeşim Yüksel, [™]Özer Erdem Gür

Department of Otolaryngology, Antalya Training and Research Hospital, Antalya, Turkiye

Cite this article as: Yüksel Y, Gür ÖE. Evaluation of distribution and revisit rates of pediatric otorhinolaryngologic diseases visits to emergency department and outpatient clinics. *J Health Sci Med.* 2025;8(6):1164-1170.

ABSTRACT

Aims: This study aims to evaluate the distribution of acute pediatric otorhinolaryngologic (ORL) diseases and their revisit rates across three clinical departments-pediatric emergency departments, pediatric outpatient clinics, and otorhinolaryngology outpatient clinics-within a tertiary care hospital. The objective is to identify triage patterns that can optimize healthcare delivery and inform appropriate clinic referrals for common pediatric ORL conditions.

Methods: A retrospective cross-sectional study was conducted between January 2014 and December 2024. Patients under the age of 18 who presented to the specified clinics with acute ORL diseases were included based on ICD-10 diagnostic codes. Data from the years 2020-2022 were excluded due to the COVID-19 pandemic. Patient counts and revisit frequencies were obtained from hospital records with support from the Information Technology department and approval from the institutional ethics committee.

Results: The distribution of acute ORL diagnoses showed significant variation across clinics. Pharyngitis, tonsillitis, multiple and unspecified upper respiratory tract infections (URTI), and allergic rhinitis were the most common diagnoses, while nasopharyngitis, laryngitis, croup, and otitis externa were less frequently observed. Pediatric emergency department had higher rates of pharyngitis and unspecified URTI, whereas pediatric outpatient clinics saw more allergic rhinitis and sinusitis cases. The otorhinolaryngology clinic had elevated rates of sinusitis, otitis media (both suppurative and non-suppurative), and allergic rhinitis. Revisit rates also differed: emergency departments had the highest for pharyngitis and URTI; pediatric clinics led in allergic rhinitis revisits; and otorhinolaryngology clinic had the highest revisit rates for sinusitis and otitis media.

Conclusion: Patterns of presentation and revisit for acute pediatric ORL diseases differ significantly across clinical departments. Emergency departments are frequently utilized for conditions that could be more appropriately managed in outpatient settings, potentially delaying access to specialist care. Accurate diagnosis and timely referral are important for preventing complications, especially in ORL diseases such as otitis media and sinusitis. These findings underscore the need for improved triage and education to optimize resource utilization and patient outcomes in pediatric ORL care.

Keywords: Otorhinolaryngologic disease, pediatric, rhinosinusitis, otitis media

INTRODUCTION

Pediatric otorhinolaryngologic (ORL) diseases are among the most frequent reasons for emergency department and outpatient clinic visits. Conditions such as acute otitis media, tonsillitis, and sinusitis are among the commonest childhood disorders and important reasons for parents and children to visit the physicians/otolaryngologists.¹⁻³

The symptoms presentation and initial management of pediatric ORL disorders in children is a significant factor in the outcome of these disorders. It is a well-established fact that initial consultations typically occur with general practitioners, emergency specialist or pediatricians rather than ORL specialists. Many ORL diseases, despite having distinct clinical diagnoses, share overlapping symptoms

such as high fever, difficulty swallowing, nasal discharge, ear pain, headache, and sore throat. These similarities can lead to misdiagnosis, especially in emergency cervices and primary care settings, resulting in delayed referrals to ORL specialists. In children, acute ORL diseases such as otitis media, tonsillitis, and sinusitis may spread to intracranial structures and the orbital region due to delays in diagnosis and treatment, potentially leading to complications associated with high morbidity and mortality.⁴⁻⁶

Emergency departments are units that provide uninterrupted emergency healthcare services and perform urgent medical interventions. However, this primary function of emergency departments is disrupted due to the large number of patients

Corresponding Author: Yeşim Yüksel, yesimgedikli@gmail.com



who present with non-urgent conditions. The main reasons for this are failure to seek treatment in accordance with the definition of an emergency, and the use of emergency departments as primary healthcare units or specialist outpatient clinics. In addition to actual ORL emergencies such as retropharyngeal abscess, epiglottitis, mastoiditis, peritonsillar abscess, epistaxis, and foreign bodies in the ear or nose, all diseases affecting the ear, nose and throat region are treated in the emergency department. Particularly in diseases such as acute otitis media and acute rhinosinusitis, the correct diagnosis by specialists in the relevant field using the necessary devices and equipment not only ensures that the necessary treatment is administered but also contributes to preventing negative outcomes such as the disease becoming chronic and the development of complications. 58.9

Understanding the distribution and revisit patterns of pediatric ORL cases across different clinical departments is essential for improving early diagnosis and optimizing healthcare delivery. This study aims to determine the distribution of the most common acute pediatric ENT diseases in the pediatric emergency department, pediatric diseases, and otorhinolaryngology outpatient clinics of a tertiary hospital, and to compare the revisits rates in the emergency department and outpatient clinics.

METHODS

This retrospective cross-sectional study evaluates patients who presented to the pediatric emergency department, pediatric outpatient clinics, and otorhinolaryngology outpatient clinics between January 2014 and December 2024 due to acute ORL diseases. The study was approved by the Antalya Training and Research Hospital Scientific Researches Ethics Committee (Date: 03.07.2025, Decision No: 11/23). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

All patients included in the study were selected using the diagnosis codes from the ICD-10 version of the International Statistical Classification of Diseases and Related Health Problems (ICD) system, published by the World Health Organisation. Data from 2020, 2021, and 2022, the years in which the coronavirus disease (COVID-19) pandemic was reported by the WHO as active, and patients aged 18 years and older were excluded from the study. Additionally, acute ORL disease diagnosis codes recorded in clinic visits outside the clinics included in the study, visits in which the diagnosis was not made by the relevant specialist physicians, patients who received more than one acute ORL disease diagnosis code during their visit, and patients whose visit included an additional diagnosis code other than the acute ORL disease diagnosis code were excluded from the study. Visits made to the relevant clinics within 10 days after a previous visit were not included in the study.

All patients under the age of 18 who were diagnosed by specialist physicians with the diseases corresponding to the ICD-10 diagnosis codes listed in Table 1 were included in the study. In ICD-10 diagnosis codes, the digits following the decimal point represent more specific subcategories or clinical details of a disease or condition. To minimize the potential impact

of inaccurate differential diagnoses and to ensure optimal evaluation, these subcategories have been considered within the framework of the general category code of the disease, as presented in Table 1. The number of patients diagnosed with the selected ICD-10 codes by relevant specialists, along with the number of repeat visits made by the same patients to the same department, were obtained from hospital records by the Information Technology departments after receiving the necessary permissions. The number of patients and repeat visits corresponding to each diagnosis code were recorded separately for the pediatric emergency department, pediatric outpatient clinic, and otorhinolaryngology outpatient clinic, and were subsequently analyzed through comparative evaluation.

Table 1.	ICD-10 codes and disease descriptions included in the study			
J00	Nasopharyngitis			
J01	Sinusitis			
J02	Pharyngitis			
J03	Tonsillitis			
J04	Laryngitis and tracheitis			
J05	Croup and epiglottitis			
J06	Multiple and Unspecified URTI			
J30	Vasomotor and allergic rhinitis			
H60	Otitis externa			
H65	Non-suppurative OM			
H66	Suppurative and unspecified OM			
URTI: Upper respiratory tract infection, OM: Otitis media				

Statistical Analysis

The statistical analysis of the obtained data was performed using the SPSS for Windows 11.5 software package. The Chi-square test and one-sample Chi-square test were used for statistical analysis. Descriptive values were expressed as frequencies and percentages. The statistical significance threshold was set at 0.05.

RESULTS

When examining the distribution of total patient numbers and rates attending the emergency department, pediatric clinics and otorhinolaryngology outpatient clinics, it was found that the distribution of acute ORL disease diagnosis groups was not similar. Nasopharyngitis, laryngitis and tracheitis, croup, and epiglottitis, and otitis externa were observed at low rates, while pharyngitis, tonsillitis, multiple and unspecified acute upper respiratory tract infections (URTI), and allergic rhinitis were found to be high. This difference in distribution was found to be statistically significant (Table 2, Figure 1).

Patient numbers were provided separately for each clinic and diagnosis, and the proportions of these numbers among all patients in the same clinic were evaluated (Table 3). For each separate clinic, differences were observed in the number of patients specific to the diagnosis, their proportions, and the total number of visits. In the pediatric emergency department, it was observed that the distribution of patients with different acute ORL disease diagnoses was not similar. Pharyngitis,

Table 2. The number of patients distribution among all patients, and visits	1 0	1 1
Acute ORL disease	Total patient	Total outpatient

10160						
Acute ORL disease	Total p	atient	Total outpatient visit#			
(2014-2019, 2023-2024)	n	%				
Nasopharyngitis	12920	1.83	13391			
Sinusitis	69798	9.87	78369			
Pharyngitis	175664	24.85	210099			
Tonsillitis	125447	17.75	140778			
Laryngitis and tracheitis	3123	0.44	3207			
Croup and epiglottitis	737	0.11	763			
Multiple and unspecified URTI	118630	16.78	137262			
Allergic rhinitis	106822	15.11	134293			
Otitis externa	15051	2.13	15685			
Non-suppurative OM	28083	3.97	30683			
Suppurative and unspecified OM	50614	7.16	55816			
Total	706889	100	820346			
p	0.001					
ORL: Otorhinolaryngologic, URTI: Upper respiratory tract infection, OM: Otitis media						

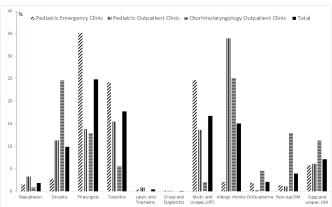


Figure 1. Diagnosis-specific patient ratios for each clinic and for the total patient cohort

tonsillitis, multiple and unspecified URTI, and suppurative and unspecified OM were found to be higher in proportion than other acute ORL disease patients presenting to the pediatric emergency department. For patients attending the pediatric outpatient clinic, sinusitis, pharyngitis, tonsillitis, multiple and unspecified URTI, and allergic rhinitis were found to be more prevalent, while the distribution of other diagnosis groups was similar. For the otorhinolaryngology outpatient clinic, it was determined that the patient rates for sinusitis, pharyngitis, tonsillitis, allergic rhinitis, non-suppurative OM, and suppurative and unspecified OM were high, while the rates for other diagnostic groups were low and similar to each other (Table 3, Figure 1).

It has been determined that the number and rate of visits to the emergency department, pediatric clinic, and otorhinolaryngology outpatient clinic differ between disease groups. The number and rate of outpatient visits for each clinic, by separate diagnosis groups, are given in **Table 4**. The most common diagnoses in the pediatric emergency department were pharyngitis, multiple and unspecified URTI, and tonsillitis. In the pediatric outpatient clinic, the most common diagnoses were allergic rhinitis, tonsillitis, pharyngitis, multiple and unspecified URTI, and sinusitis. The most common diseases presenting at the otorhinolaryngology outpatient clinic were identified as Allergic rhinitis, Sinusitis, Non-suppurative OM, Pharyngitis, and Suppurative and unspecified OM.

Table 5 presents the revisit rates for each acute ORL disease diagnosis group. Inter-clinic comparison revealed no significant differences for the diagnoses of nasopharyngitis, laryngitis and tracheitis, and croup and epiglottitis. In contrast, significant differences were observed between clinics for the diagnoses of sinusitis, pharyngitis, multiple and unspecified URTI, allergic rhinitis, otitis externa, and suppurative and unspecified OM. The emergency department was identified as the clinic with the highest rate

Table 3. The number of patients specific to the clinic and diagnosis they visit, along with the proportional distribution of these patients among all patients of the clinic

Acute ORL disease	Pediatric emergency clinic total patient		Pediatric outpatient clinic total patient		Otorhinolaryngology outpatient clinic total patient	
(2014-2019, 2023-2024)	n	%	n	%	n	%
Nasopharyngitis	5751	1.54	5637	3.31	1532	0.94
Sinusitis	10226	2.74	19333	11.34	40239	24.58
Pharyngitis	130990	35.15	23536	13.81	21138	12.91
Tonsillitis	90018	24.16	26407	15.49	9022	5.51
Laryngitis and tracheitis	1501	0.40	1464	0.86	158	0.10
Croup and epiglottitis	657	0.18	80	0.05	0	0
Multiple and unspecified URTI	92053	24.70	23245	13.64	3332	2.03
Allergic rhinitis	7794	2.09	57946	33.99	41082	25.09
Otitis externa	7122	1.91	485	0.28	7444	4.55
Non-suppurative OM	4955	1.33	1869	1.10	21259	12.98
Suppurative and unspecified OM	21599	5.80	10482	6.15	18533	11.32
Total	372666	100	170484	100	163739	100
p	0.0	001	0.0	001		0.001
ORL: Otorhinolaryngologic, URTI: Upper respiratory tract infection, OM: Otitis media						

Table 4. Clinic-level distribution and comparative analysis of total patient visits and visit rates by specific diagnoses						
Acute ORL disease	Pediatric emergency deparment visit (1)		Pediatric outpatient clinic visit (2)		Otorhinolaryngology outpatient clinic visit (3)	
(2014-2019, 2023-2024)	#	%	#	%	#	%
Nasopharyngitis	5882	1.36	5952	2.99	1557	0.82
Sinusitis	10504	2.43	20735	10.40	47130	24.95
Pharyngitis	161010	37.26	26018	13.06	23071	12.21
Tonsillitis	101245	23.43	29574	14.84	9959	5.27
Laryngitis and tracheitis	1539	0.36	1507	0.76	161	0.09
Croup and epiglottitis	682	0.16	81	0.04	0	0.00
Multiple and unspecified URTI	108106	25.02	25746	12.92	3410	1.80
Allergic rhinitis	8024	1.86	75807	38.04	50462	26.71
Otitis externa	7224	1.67	493	0.25	7968	4.22
Non-suppurative OM	5250	1.21	1999	1.00	23434	12.40
Suppurative and unspecified OM	22673	5.25	11373	5.71	21770	11.52
Total	432139	100.0	199285	100.0	188922	100.00
p			(0.001		
ORL: Otorhinolaryngologic, URTI: Upper respiratory tract infection, OM: Otitis media						

Table 5. Diagnosis-specific patient revisit rates by clinic of initial visit and corresponding comparative analysis							
Acute ORL disease	Pediatric emergency deparment (1)	Pediatric outpatient clinic (2)	Otorhinolaryngology outpatient clinic (3)		Statistically		
(2014-2019, 2023-2024)	%	%	%	p	significant groups		
Nasopharyngitis	2.23	5.29	1.61	0.126			
Sinusitis	2.65	6.76	14.62	0.001	1-2-3		
Pharyngitis	18.64	9.54	8.38	0.001	1-2-3		
Tonsillitis	11.09	10.71	9.41	0.001	1-3, 2-3		
Laryngitis and tracheitis	2.47	2.85	1.86	0.664			
Croup and epiglottitis	3.67	1.23	0.0	0.254			
Multiple and unspecified URTI	14.85	9.71	2.29	0.001	1-2-3		
Allergic rhinitis	2.87	23.56	18.59	0.001	1-2-3		
Otitis externa	1.41	1.62	6.58	0.001	1-2-3		
Non-suppurative OM	5.62	6.50	9.28	0.001	1-3, 2-3		
Suppurative and unspecified OM	4.74	7.83	14.87	0.001	1-2-3		
ORL: Otorhinolaryngologic, URTI: Upper respiratory tract infection, OM: Otitis media							

of repeat visits, particularly for Pharyngitis and Multiple and Unspecified URTI diagnoses, followed by the pediatrics and otorhinolaryngology outpatient clinics. The highest rate of repeat visits for Allergic rhinitis diagnoses was observed in the pediatrics outpatient clinic, which was higher than that of the otorhinolaryngology outpatient clinic. The frequency of repeat visits for sinusitis, otitis externa, and suppurative and unspecified OM patients was found to be, in order, the otorhinolaryngology outpatient clinic, the pediatrics outpatient clinic, and the pediatric emergency department. Furthermore, the rate of repeat visits for tonsillitis diagnosis was found to be lower in the otorhinolaryngology outpatient clinic compared to the pediatric emergency department and pediatric outpatient clinic; however, it was found to be higher for non-suppurative OM diagnosis (Table 5, Figure 2).

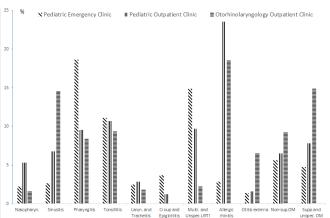


Figure 2. Diagnosis-specific patient revisit rates based on the clinic of initial

DISCUSSION

Evaluating the clinical preferences and number of visits related to acute pediatric ORL diseases is valuable for identifying healthcare utilization patterns and planning service delivery accordingly. In this study, the profile of patients presenting to the pediatric emergency department aligns with complaintbased visits due to acute symptoms and is closely associated with parental concerns regarding the sudden onset and severity of symptoms. Furthermore, the assessment of initial and repeat visits to pediatric and otorhinolaryngology outpatient clinics reflects families' conscious choices in the treatment process and the feasibility of implementing targeted clinical interventions. Although the ICD-10 diagnostic codes have been reported to have certain limitations such as coding accuracy, diagnostic specificity and consistency, their use is nevertheless considered essential because the large sample size enables standardization in epidemiological studies and health system planning, thereby allowing for systematic analysis. 10-12 Conducted in a tertiary care center using ICD-10 diagnostic codes and a large case series, this study provides an opportunity to analyze healthcare utilization habits and evaluate which diseases prompt visits to which clinics and how frequently.

Acute ORL diseases were seen at different frequencies in the clinics visited. The high rates of pharyngitis, tonsillitis, multiple and unspecified URTI, and allergic rhinitis diagnoses in all clinics indicate that these diseases are common in childhood.^{2,3,13-15} In contrast, the absence of significant differences between clinics in the diagnoses of laryngitis and tracheitis, croup and epiglottitis can be explained by the relatively rarer occurrence of these diseases and their similar management.^{13,15}

The high rates of pharyngitis, tonsillitis, and multiple and unspecified URTI in the pediatric emergency department in particular suggest that more acute and symptomatic cases are evaluated in this clinic. This is consistent with the literature, which indicates that emergency departments are generally preferred due to sudden onset and severe symptoms. ^{1-3,13,14}

The number and proportion of patients diagnosed with allergic rhinitis are higher in the pediatric outpatient clinic than in the otorhinolaryngology outpatient clinic. Conversely, the number and proportion of patients diagnosed with sinusitis and otitis media are higher in the otorhinolaryngology outpatient clinic compared to the pediatrics outpatient clinic. As determined in our study, the high incidence of allergic rhinitis in pediatric clinics is due to the existence of specific specialist clinics, such as pediatric allergy and immunology clinics, in tertiary hospitals for these patients. 16,17 In the otorhinolaryngology outpatient clinic, in addition to allergic rhinitis, the high number of patients with sinusitis and nonsuppurative and suppurative OM indicates that more specific and follow-up-requiring cases are handled in this clinic. The results of our study regarding the number and proportion of patients attending otorhinolaryngology clinics are consistent with the literature. 4,9,13,15,18-20 This supports the view that specialist clinics offer a more detailed assessment in terms of diagnosis and treatment planning.

Revisit rates exhibit significant differences based on diagnosis and clinical setting, indicating that disease management processes and patient follow-up vary across clinics. There are two primary reasons for revisits: one is complaint-based visits due to acute symptoms, and the other is scheduled visits. Notably, the highest revisit rates have been observed in pediatric emergency departments for diagnoses such as pharyngitis and multiple/unspecified upper respiratory tract infections (URIs). This is primarily attributed to complaintbased visits due to acute symptoms.²¹ In pediatric outpatient clinics, diseases with high revisit rates, excluding allergic rhinitis, show similarities to those observed in pediatric emergency departments. In contrast, diseases with high revisit rates in otorhinolaryngology outpatient clinics differ substantially from those in pediatric emergency departments and outpatient clinics. This discrepancy may be due to the inclusion of scheduled visits in otorhinolaryngology outpatient clinics, in addition to complaint-based visits due to acute symptoms.

The differential diagnosis of acute ORL diseases may not be adequately performed in emergency department settings. Diagnosing pediatric rhinosinusitis is challenging because the symptoms often resemble those of other URTI, allergic rhinitis, and adenoiditis.²² In addition to the difficulty in expressing symptoms in the pediatric age group, difficulties in diagnosis are caused by factors such as children's inability to tolerate nasal endoscopy, which supports the diagnosis of rhinosinusitis, and the limited use of computed tomography due to radiation exposure.²³ Particularly in diseases such as sinusitis, tonsillitis, suppurative and non-suppurative otitis media, detailed examination in otorhinolaryngology outpatient clinics and endoscopic evaluation in appropriate patients are much more valuable for accurate diagnosis and treatment planning than examination in emergency department conditions and pediatric outpatient clinics where endoscopic examination is not possible are much more valuable in terms of accurate diagnosis and treatment planning compared to examinations performed in emergency department settings and pediatric clinics where endoscopic examination is not possible. This enables the optimal followup and treatment of acute ORL diseases that carry a risk of chronicity and/or may lead to serious complications, such as sinusitis and suppurative otitis media.^{5,8,13,22-24} In our study, the high rate of repeat visits to the otorhinolaryngology outpatient clinic by patients with sinusitis, suppurative and non-suppurative otitis media also supports this situation. In the otorhinolaryngology outpatient clinic, it is important that the follow-up process is more regular and long-term in order to be able to decide on surgical treatment for these diseases when necessary.8 In contrast, the low rate of repeat visits for tonsillitis, particularly in the otorhinolaryngology outpatient clinic, may indicate the effectiveness of the treatment and follow-up protocols applied in this clinic. Among the acute ORL diseases included in our study, the highest rates of repeat visits were observed in allergic rhinitis. Particularly in allergic rhinitis, difficulties in managing symptoms and the need for long-term follow-up lead to repeated patient visits to pediatric and otorhinolaryngology outpatient clinics. The frequency of repeat visits by allergic rhinitis patients is expected due to the

condition affecting all pediatric age groups and its associated diseases. 17,25

Limitations

This study is a healthcare utilization analysis focused on disease burden, clinical preferences, and revisit behaviors, based on the internationally recognized ICD-10 diagnosis codes. Although not a prevalence or incidence study, this retrospective cross-sectional study reveals the clinical visit behaviors and patient orientation patterns of pediatric acute ORL disease cases at a tertiary care hospital, supported by a large case series spanning several years. However, since the study is based on selected ICD-10 diagnostic codes, the distribution of patients and revisit rates is inherently dependent on the accuracy of clinical assessments and diagnostic precision by of the respective clinicians. In clinical practice, these diagnoses are used interchangeably or may overlap. For example, the differential diagnosis between nasopharyngitis and pharyngitis may not always be clearly established, and due to symptomatic similarities, clinicians may have entered the ICD-10 code for "Multiple and Unspecified URTI" instead of more specific diagnoses such as nasopharyngitis, pharyngitis, or sinusitis. The potential inconsistency in ICD-10 code selection and limitations in differential diagnosis could have occurred similarly or differently across all physicians in the pediatric emergency department, pediatric outpatient clinics, and otorhinolaryngology outpatient clinics. However, due to the retrospective nature of the study, it is not possible to determine this. Repeat visits to the pediatric emergency department for the same ICD-10 diagnosis code generally represent complaint-based visits due to acute symptoms, whereas visits to pediatric and otorhinolaryngology outpatient clinics may be either complaint-based or scheduled visits. Additionally, the fact that the data were obtained from a single center, and that demographic and socio-economic variables, follow-up intervals, and treatment plans were not included in the analysis, are also among the limitations of this study.

CONCLUSION

The findings obtained in our study are epidemiologically significant due to the large sample size. This study has revealed marked differences in the distribution of acute ORL diseases across clinics and in the rates of repeat visits. These differences are shaped by the functional roles of the clinics, patient profiles, and the nature of the diseases. It is recommended that clinic-specific follow-up protocols be developed, family education and symptom management strategies be strengthened to reduce revisit rates. Taking these data into account in the planning of healthcare services is important for the effective use of resources and increasing patient satisfaction.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of the Antalya Training and Research Hospital Scientific Researches Ethics Committee (Date: 03.07.2025, Decision No: 11/23).

Informed Consent

Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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