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ORIGINAL RESEARCH

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Prevalence of otolaryngological disease in a refugee population compared to US-born patients

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Abstract

Objective: Limited data exists regarding otolaryngological (ENT) disease in refugees and we aim to characterize its prevalence.

Methods: This is a retrospective descriptive chart review of adult US-born, immigrant, and refugee patients receiving care at a primary care clinic between 2014 and 2017. We report the prevalence of ENT disease by immigration status. Bivariable and multivariable logistic regression models were conducted to assess differences in prevalence of ENT disease by immigration status.

Results: Of 995 patients included, 202 US-born, 450 immigrants, and 343 were refugees. Immigrants were older (46 years vs. 34 years among refugees, 35.5 years among US-born, $p < .001$) and more likely to be women (64% vs. 52% among refugees and 56% among US-born, $p = .003$). Among refugees, 27% were Central American, 22% Chinese, and 9.3% Middle Eastern. Hearing loss and allergic rhinitis were the top two diagnoses among the three groups of immigration status. More refugees had at least 1 ENT diagnosis compared to the other groups (16% vs 14% among immigrants and 6% US-born, $p < .001$). Refugees were more likely to have at least 1 ENT diagnosis compared to US-born individuals (age and gender adjusted [aOR] 3.40, 95% CI [1.80–6.95], $p < .001$) and immigrants (aOR 1.62, [1.05–2.51], $p = .03$).

Conclusion: ENT disease is prevalent among refugees, necessitating standardized evaluation during refugee health assessments and identifying barriers to referral and treatment.

Level of evidence: 2b.

KEYWORDS
health burden, immigrants, otolaryngologic disease, refugees, screening

1 | INTRODUCTION

By the end of 2021, 89.3 million people were forcibly displaced worldwide due to conflict, famine, and political unrest; of those 4.6

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million were seeking asylum.[1] Refugees and asylees are defined as people who leave their home as a result of persecution, conflict, violence, or human rights violations; refugees apply for their status in their home country, while asylees apply in the host country.[2,3] The United States (US) admitted more than 29,900 refugees and approved 46,508 asylum cases in 2019.[4] All people seeking asylum or refugee status in the United States (excluding those for short term stay) are eligible to receive a medical examination.[5] There are many factors that affect the overall medical and psychological health of resettled people including access to care in their country of origin, during their path to resettlement, and in the receiving country.[6]

To date, the burden of psychological conditions and infectious diseases among immigrant and refugee populations has been well characterized.[6–9] While the American Academy of Otolaryngology reported that thyroid and parathyroid disease, hearing loss, chronic ear disease were among the top three conditions requiring intervention in low and middle-income countries, there is little information regarding the prevalence of non-infectious conditions, such as otolaryngology (ENT) disease, of refugees in the US.[9–13] The limited studies looking at certain ENT conditions have noticed that, when refugees have an ENT diagnosis, refugees tend to have more severe disease compared to their native counterparts.[11] Moreover, lack of access to timely and high-quality specialty care in their home country places refugees and asylees at a higher risk for chronic disease such as cholesteatoma and hearing loss.[7,11] Given that access to ENT care is scarce in many low-income countries, due to lack of doctors/health personnel, it is imperative to understand and assess ENT needs of this patient population when they resettle to the US.[14,15] A better characterization of ENT disease among immigrants would allow for appropriate resource allocation to ensure access to timely care and minimize chronic suffering from untreated curable disease.

Displaced individuals have unique health conditions due to various exposures that are unlike others in their country of origin, non-forcibly displaced immigrants, or native-born people in the welcoming country. Identifying and understanding their distinct health profiles and needs is essential to providing appropriate care. This will allow for better understanding of the impact untreated disease may have on quality of life. In this study, we extracted data from the electronic health records (eHR) from a large urban safety-net primary care clinic to investigate the primary ENT diagnoses asylees and refugees present with as compared to other non-forcibly displaced immigrant and non-immigrant patients.

2 | MATERIALS AND METHODS

2.1 | Study design, setting, and definitions

This is a retrospective descriptive chart review of patients receiving care at a large, urban, safety-net primary care clinic between January 2014 and December 2017. Patients were divided into three groups based on immigration status: US-born, immigrants, and refugees and asylees. Patients were identified as US-born if they had any of the following: English as the preferred language, a US region was listed as place of origin, or no world region or preferred language other than English listed in eHR structured and unstructured fields. A preferred language other than English, need for an interpreter, or country of origin other than the US listed in the eHR was used to identify immigrant patients. The refugee/asylee patients were identified by the presence of a refugee health assessment or mention of refugee or asylee status in the social history in the eHR. The refugees and asylees who arrive in San Francisco County are enrolled in the San Francisco Department of Public Health's (DPH) Newcomers Health Program (NHP), nested within the primary care clinic. Refugees and asylees receive their initial health exam at this clinic. This study was approved by the Institutional Review Board.

2.2 | Patient population

A total of 1159 patients were identified from 2014 to 2017. Refugee/asylee patients who attended at least one follow up after their intake visit in primary care clinic were included ($N = 343$) (Table 1). Next, a random unmatched sample of US-born ($N = 202$) and non-refugee immigrant ($N = 450$) patients was selected from a list of all patients seen in the clinic.

2.3 | Data collection

Trained data extractors conducted manual chart abstraction for all patients. Demographic characteristics were obtained in unstructured data fields, such as social histories. Medical conditions were gathered from problem lists containing International Classification of Diseases codes (ICD). Of the extracted data, 10% was manually verified for consistency and accuracy after collection. Presence and results of audiometric testing was obtained for patients with a diagnosis of hearing loss. Audiogram data was collected at the following frequencies in Hertz: 500, 1000, 2000, and 4000. Pure tone average (PTA) was calculated for the best and worst ear. The refugee health assessment is conducted over two visits. During the first visit, clinicians conduct a physical evaluation and patients are evaluated for communicable and chronic diseases. During the second visit, clinicians review and discuss laboratory results with the patient. Referrals are made to specialists based on findings from the initial refugee health exam, patients' insurance status, and place of residence.

2.4 | Outcomes

The outcomes of interest were presence of any ENT diagnosis as indicated by ICD codes in the problem lists (H60–H95, J00–J39, K11–K22.5, L72). These outcomes were selected as they are relevant ICD codes of ENT diagnosis. For patients with a diagnosis of hearing loss, audiometric data was reported when available.

TABLE 1 Demographic characteristics of all US-born, immigrants, and refugees and asylees seen in a large urban safety-net clinic.

	US-born No. (%)	Immigrants No. (%)	Refugee/asylee No. (%)	*p*-value
Totals	202	450	343	
Patients with ≥1 ENT diagnosis	12	64	56	
Age median (SD)	35.5 (16.8)	46 (16.4)	34 (12.8)	<.001
Gender (male)	88 (44)	164 (36)	165 (48)	.003
Preferred language				
English	195 (96)	59 (13)	7 (2)	
Spanish	5 (2.5)	255 (56)	134 (39)	
Mandarin & Cantonese	0 (0)	41 (9)	10 (3)	
Arabic	<5 (<2.5)	14 (3)	28 (8.2)	
Other	1 (0.49)	81 (18)	164 (48)	
Age				
0–29	71 (35)	60 (13)	130 (38)	<.001
30–59	96 (47)	266 (59)	198 (58)	.01
60 and older	35 (17)	124 (27)	15 (4)	<.001
Region of origin				
North America	28 (14)	13 (3)	8 (2)	
Central and South America	0 (0)	116 (25)	106 (31)	
Mexico	0 (0)	69 (15)	20 (6)	
Asia and South Pacific	<5 (<2.5)	82 (18)	49 (14)	
China	0 (0)	43 (10)	77 (22)	
MENA and Sub-Saharan Africa	0 (0)	30 (6)	54 (16)	
Europe	0 (0)	15 (3)	20 (6)	
Unknown	173 (85)	82 (18)	<5 (2)	

Note: Demographic characteristics are included by groups. Categorical variables were reported as both a number and percentage. Descriptive analysis of continuous variables is reported as a mean and SD. Differences in age was assessed using a one-way ANOVA while difference in gender was assessed by Fisher's exact test.

Abbreviations: ASL, American Sign Language; MENA, Middle East or North Africa; No, number; SD, standard deviation; US, United States.

2.5 | Covariates

Covariates of interest include age category (18–34, 35–64, 65 years and older), gender (female or male), race and ethnicity (Asian and Pacific Islander, Black, Latino/a, Middle Eastern or North African, White, Other/unknown), which was self-identified in most cases; preferred language (Arabic, Cantonese, English, Spanish, Other); and region of origin (China, Europe, Mexico, other Asia and South Pacific, other Central and South America, Middle East and North Africa, Sub-Saharan Africa, the US and Canada, and unknown).

2.6 | Statistical analysis

We compared outcomes in US-born, immigrant, and refugee patients. Descriptive statistics, including frequencies and percentages for categorical data and mean values with standard deviations for continuous data, were used to summarize key exposure and outcome variables. Differences in gender were assessed using Fisher's exact test. Differences in the prevalence of at least 1 ENT diagnosis among each group versus the rest of the patients was also assessed with Fisher's exact test. Bivariable and multivariable logistic regression models were performed between groups to assess differences in the presence of at least 1 ENT diagnosis. Immigration status was the primary independent variable. In four separate bivariable models, we compared outcomes (>1 ENT diagnosis) for (1) immigrant versus US-born (reference), (2) refugees versus US-born (reference), (3) refugees versus immigrants (reference), and (4) refugee/immigrant versus US-born (reference). Four analogous multivariable models were performed adjusting for age and gender.

A power calculation was done which assumed 80% power (1 − beta) and a two-sided alpha of 0.05. We based these calculations on previously published prevalence of ENT diagnosis at a primary care clinic in the US of 25%.[16] In this study, we looked at if immigration status (US-born, immigrant, refugee/asylee) was associated with having more than 1 ENT conditions. To detect an odds ratio of 0.20–0.30 of having more than 1 ENT diagnosis in refugee/asylee patients compared to US-born patients, we would need a sample size of 241–261 refugee/asylee patients and 113–123 US-born patients. We present 95% confidence intervals (CI) to characterize uncertainty in effect estimates.

3 | RESULTS

3.1 | Demographic characteristics

Of 995 patients analyzed, there were 343 refugees, 450 immigrants, and 202 US-born (Table 1). Immigrants were older (46 years vs. 34 years among refugees, 35.5 years among US-born, $p < .001$) and more likely to be women (64% vs. 52% among refugees and 56% among US-born, $p = .003$) (Table 1).

Spanish was the most spoken language for the immigrant group ($N = 255$, 56%). For the refugee group, 134 (39%) spoke Spanish, 28 (8%) spoke Arabic, 10 (3%) Spoke Mandarin or Cantonese, and 7 (2%) spoke English (Table 1). Many patients within the immigrant group were from Central and South America (116, 25%), Asia or South Pacific ($N = 82$, 18%), and Mexico ($N = 69$, 15%). Among the refugees, 106 (31%) were from Central and South America, 77 (22%) were from China, and 54 (16%) were from the Middle East and North Africa (MENA) or Sub-Saharan Africa (Table 1).

TABLE 2 Prevalence of >1 ENT diagnosis by immigration status.

Groups	More than 1 ENT diagnosis No. (%)
Totals	132 (13.2)
US-born	12 (6)*
Immigrants	64 (14)
Refugees	56 (16)

Note: Fisher's exact test was used to assess significance for each group versus the rest of the patients.
Abbreviations: ENT, otolaryngological; No., number; US, United States.
*$p < .0001$.

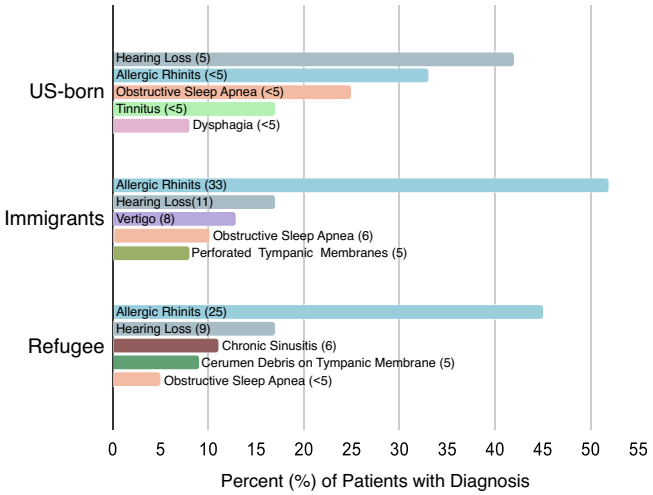

FIGURE 1 Top five ENT diagnosis across US-born, immigrant and refugee patients. Below are all the patients who had 1 or more ENT diagnosis. Diagnosis is presented with the total number of patients. The y-axis is the percent of patients. Allergic rhinitis and hearing were top two diagnoses among the three groups. ENT, otolaryngological; US, United States.

3.2 | Presence of ENT diagnosis

The highest percentage of patients with at least 1 ENT diagnosis were refugees/asylees ($N = 56$, 16%), followed by immigrants ($N = 64$, 14%), and the US-born group had the least ($N = 12$, 6%). US-born (6%) patients were less likely to have >1 ENT diagnosis compared to both refugees (16%) and immigrants (14%) ($p < .001$) (Table 2). The most common diagnosis for refugees and immigrants was allergic rhinitis (45% and 52%, respectively). Hearing loss was the most common ENT diagnosis for US-born patients (42%) and the second most common diagnosis among the refugees and immigrants (6% and 17%, respectively). The three groups differed in their third, fourth, and fifth most common diagnosis, but obstructive sleep apnea was commonly reported among the three groups (5% among refugees, 10% among immigrants, 25% US-born, respectively) (Figure 1). There were 5 (41%) US-born, 11 (17%) immigrants, and 9 (16%) of refugees with a diagnosis of hearing loss. Of the patients diagnosed with hearing loss, 2 (25%) of refugees, 7 (64%) immigrants, and 3 (60%) of US-born had diagnostic audiograms available in the eHR (Table 3). Of immigrant patients with audiograms, 2 (28%) were found to have normal hearing. Refugees with hearing loss were younger with an average age of 42 (SD 25.2) compared to the other two groups (Table 3).

3.3 | Comparison of ENT diagnosis among the groups

When patient groups were then compared to each other for presence of at least 1 ENT diagnosis as the outcome in bivariable logistic

TABLE 3 Audiometric data for patients with a diagnosis of hearing loss.

	US-born $N = 5$	Immigrants $N = 7$	Refugees/asylees $N = 8$
Total audiograms available (%)	3 (60)	5 (71)	2 (25)
SNHL, *N* (%)	3 (100)	2 (40)	2 (100)
Mixed HL, *N* (%)	0	3 (60)	0
Age, mean (SD)	63 (4.9)	68 (15.6)	42 (26.2)

Note: Results from available audiograms for patients with a hearing loss diagnosis among the three patient groups.
Abbreviations: dB, decibels; HL, hearing loss; PTA, pure tone average; SD, standard deviation; SNHL, sensorineural hearing loss; US, United States.

TABLE 4 Presence of at least 1 ENT diagnosis by immigration status.

	Bivariable logistic models		Multivariable logistic models	
Groups	**Odds ratio [95% CI]**	***p*-value**	**Adjusted odds ratio [95% CI]**	***p*-value**
Immigrant vs. US-born (ref)	2.62 [1.36–5.47]	.01	2.14 [1.15–4.31]	.02
Refugees vs. US-born (ref)	3.08 [1.58–6.49]	<.001	3.40 [1.80–6.95]	<.001
Refugees vs. immigrants (ref)	1.18 [0.78–1.77]	.42	1.62 [1.05–2.51]	.03
Refugee or immigrant vs. US-born (ref)	2.82 [1.51–5.73]	<.001	2.87 [1.60–5.60]	<.001

Note: Bivariable and multivariable logistic regression analysis. Bivariable and multivariable logistic regression analysis were used to calculate significance in differences among a group versus another with regards to having at least 1 ENT diagnosis. *p*-values are reported for each odds ratio as well as an adjusted odds ratio, adjusting for age and gender. Based on a sample of 202 US-born, 450 immigrant, and 343 refugees/asylee patients. Groups were compared to one another with the second group acting as the reference group indicated by (ref).
Abbreviations: CI, confidence interval; vs., versus; US, United States.

regression models (Table 4), before and after adjusting for age and gender, immigrants had 2.14 increased odds of having at least 1 ENT diagnosis when compared to US-born patients (adjusted odds ratio [aOR] [CI (95% confidence interval)] = aOR 2.14 [1.15–4.31]). Similarly, refugees had 3.4 times increased odds of having at least 1 ENT diagnosis (aOR 3.40 [1.80–6.95]) compared to the US-born patients (Table 4). When we compared refugees to immigrants, the refugee group had increased odds of having at least 1 diagnosis (aOR 1.62 [1.05–2.51]) (Table 4). We were not able to reject the null hypothesis that there is not an association between immigration status and prevalence of ENT diagnosis.

4 | DISCUSSION

To our knowledge, this study is one of the largest to date on ENT disease among resettled refugees and asylees in the United States. We found that the top three most common ENT diagnoses among refugees are allergic rhinitis, hearing loss, and chronic sinusitis. Interestingly, we also showed that refugees are more likely than their immigrant or US-born counterparts to have at least 1 ENT diagnosis. Additionally, when we compared audiologic data regarding hearing loss refugees were found to have worse PTA and less follow up diagnostic audiograms compared to the other two groups.

We show that both immigrants and refugees are more likely to have >1 ENT diagnosis, even after adjusting for age and gender, with refugees/asylees being more likely to have >1 ENT diagnosis compared to immigrants. Similar to our findings, a study comparing health conditions of refugees and immigrants found that refugees were two times more likely to have a chronic health condition compared to non-refugees immigrants.[17] This may be due to several reasons. The "immigrant health advantage", a hypothesis that postulates that people who choose to emigrate are healthier, may explain the differences we found between refugees/asylees and non-refugee immigrants.[18,19] Refugees are less likely to have a similar health advantage because their migration is often due to fleeing from war-torn countries or persecution due to political, religious, or other reasons.[20] Refugees and asylees often have less access to health care in their home country in addition to extensive histories of physical and psychological trauma spanning their migration to a safe country which can have negative impacts on quality of life.[6,15] This suggests that there may be unique factors to the refugee experience that are leading to the presentation and identification of certain health conditions, including ENT diseases.

Prior reports have listed allergic rhinitis, viral upper respiratory infections, and elevated blood pressure as the most common diagnoses among refugees resettled in Texas.[21] Interestingly we found a much higher proportion of refugees/asylees with allergic rhinitis (45%) compared to that study (7.5%).[21] Additionally, previous work showed allergic rhinitis to be among the top five diagnoses in Syrian refugees living in Turkey.[22] Some groups have postulated that the very little prevalence of allergic rhinitis in these populations is due to the "hygiene hypothesis"—where increased exposure to environmental allergens is a protective factor for allergies, asthma, and eczema.[23] However, more recent studies have reported that refugees are at higher risk of respiratory disease due to pre-migration environmental exposures, including exposure to biomass smoke and smoke from open stoves.[23] Additionally, migration may be a driving factor in the development of allergic rhinitis, with exposure to new allergens and pollutants, and in its diagnosis, with improved access to medical resources in the receiving country.[24]

Several refugee patients were identified with hearing loss. A study on adult refugees in Australia found there was a higher rate of both suppurative otitis media and cholesteatoma compared to their non-immigrant counterparts.[11] In our study, few refugees had available diagnostic audiograms in the eHR compared to the US-born or immigrant patients. This could be due to several factors including loss to follow up, care at an outside clinic, and stigma around hearing loss. One study reported that 13% of patients did not return for follow-up because they did not think their hearing loss was serious enough.[25] Hearing loss is associated with stigma in many communities, and factors such as gender, age, income, education level, and support systems have been shown to influence one's perception of one's hearing loss.[3,26,27]

There are several strengths and limitations to this study. Strengths include the size of each cohort and follow-up over 3 years. Limitations of our study include incomplete documentation regarding audiometric testing, which could be due to the transition to a new eHR system in August 2019, unscanned audiometry records, or lack

of patient follow up for diagnostic testing. Additionally, fear and other factors often limit the interaction with the healthcare system in this vulnerable population, and this could have limited the number of formal audiograms available in the eHR. Lack of information about referrals and follow up in ENT may have contributed to this as well. Lastly, the definition of US-born, non-refugee immigrant, and refugee/asylee may misclassify some patients. For example, some non-refugee immigrant patients may still prefer the English language or there may be errors in the eHR.

5 | CONCLUSION

In this study on examining prevalence of ENT disease in patients receiving care at a large urban public primary care clinic, we found that there is a higher prevalence of refugees and asylees with >1 ENT diagnosis compared to both immigrants and US-born patients. More robust screening and referral pathways for this population may be helpful. Clinicians or any clinics overseeing the care of refugees and asylees are encouraged to screen for ENT conditions compulsorily, or outreach may be needed in these communities to provide health education about allergic rhinitis, hearing loss, and other ENT conditions. Given the negative impact of certain untreated ENT disease on quality of life, it is imperative that the population is given educational information about their diagnosis and expectations are set regarding referrals to specialty care to ensure complications from disease are minimized.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

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REFERENCES

1. Refugees UNHC for. *Figures at a glance*. UNHCR. 2021. Accessed November 23, 2020. https://www.unhcr.org/figures-at-a-glance.html
2. Feltner C, Wallace IF, Kistler CE, Coker-Schwimmer M, Jonas DE. Screening for hearing loss in older adults: updated evidence report and systematic review for the US preventive services task force. *JAMA*. 2021;325(12):1202-1215. doi:10.1001/jama.2020.24855
3. Kamil RJ, Genther DJ, Lin FR. Factors associated with the accuracy of subjective assessments of hearing impairment. *Ear Hear*. 2015;36(1):164-167. doi:10.1097/AUD.0000000000000075
4. Baugh R. *Refugees and Asylees: 2019*. U.S. Department of Homeland Security Office of Immigration Statistics; 2020 www.dhs.gov/sites/default/files/publications/immigration-statistics/yearbook/2019/refugee_and_asylee_2019.pdf
5. *Guidance for the U.S. Domestic Medical Examination for Newly Arriving Refugees | Immigrant and Refugee Health*. CDC; 2021 Accessed January 18, 2022: https://www.cdc.gov/immigrantrefugeehealth/guidelines/domestic-guidelines.html
6. *Mental Health and Forced Displacement*. 2021, World Health Organization. Accessed February 15, 2022. https://www.who.int/news-room/fact-sheets/detail/mental-health-and-forced-displacement
7. Barnett ED. Infectious disease screening for refugees resettled in the United States. *Clin Infect Dis Off Publ Infect Dis Soc Am*. 2004;39(6):833-841. doi:10.1086/423179
8. Blackmore R, Boyle JA, Fazel M, et al. The prevalence of mental illness in refugees and asylum seekers: a systematic review and meta-analysis. *PLOS Med*. 2020;17(9):e1003337. doi:10.1371/journal.pmed.1003337
9. Kirmayer LJ, Narasiah L, Munoz M, et al. Common mental health problems in immigrants and refugees: general approach in primary care. *CMAJ Can Med Assoc J*. 2011;183(12):E959-E967. doi:10.1503/cmaj.090292
10. Health of resettled Iraqi refugees—San Diego County, California, October 2007–September 2009. *JAMA*. 2011;305(5):459-461. doi:10.1001/jama.2011.459
11. Benson J, Mwanri L. Chronic suppurative otitis media and cholesteatoma in Australia's refugee population. *Aust Fam Physician*. 2012;41(12):978-980.
12. Masters PJ, Lanfranco PJ, Sneath E, et al. Health issues of refugees attending an infectious disease refugee health clinic in a regional Australian hospital. *Aust J Gen Pract*. 2018;47(5):305-310. doi:10.3316/informit.587583506662799
13. Saunders JE, Rankin Z, Noonan KY. Otolaryngology and the global burden of disease. *Otolaryngol Clin North Am*. 2018;51(3):515-534. doi:10.1016/j.otc.2018.01.016
14. Ta N. ENT in the context of global health. *Ann R Coll Surg Engl*. 2019;101(2):93-96. doi:10.1308/rcsann.2018.0138
15. Myburgh HC, van Zijl WH, Swanepoel D, Hellström S, Laurent C. Otitis media diagnosis for developing countries using tympanic membrane image-analysis. *EBioMedicine*. 2016;5:156-160. doi:10.1016/j.ebiom.2016.02.017
16. O'Hara BS, Saywell RM, Zollinger TW, Smith CP, Burba JL, Stopperich DM. ENT experience in a family medicine clerkship: is there enough? *Fam Med*. 2000;32(10):691-695.
17. Kumar GS, Beeler JA, Seagle EE, Jentes ES. Long-term physical health outcomes of resettled refugee populations in the United States: a scoping review. *J Immigr Minor Health*. 2021;23(4):813-823. doi:10.1007/s10903-021-01146-2
18. Anderson NB, Bulatao RA, Cohen B, National Research Council (US) Panel on Race E. *Immigrant Health: Selectivity and Acculturation*. National Academies Press (US); 2004 Accessed March 21, 2022: https://www.ncbi.nlm.nih.gov/books/NBK25533/
19. Palloni A, Arias E. Paradox lost: explaining the Hispanic adult mortality advantage. *Demography*. 2004;41(3):385-415. doi:10.1353/dem.2004.0024
20. Reed HE, Barbosa GY. Investigating the refugee health disadvantage among the U.S. immigrant population. *J Immigr Refug Stud*. 2017;15(1):53-70. doi:10.1080/15562948.2016.1165329
21. Adel FW, Bernstein E, Tcheyan M, et al. San Antonio refugees: their demographics, healthcare profiles, and how to better serve them. *PLOS One*. 2019;14(2):e0211930. doi:10.1371/journal.pone.0211930
22. Kurtuluş Ş, Sak ZHA, Can R. Chest diseases in refugees living in a tent camp and in Turkish citizens living in the district: Ceylanpınar experience. *Turk Thorac J*. 2018;19(3):117-121. doi:10.5152/TurkThoracJ.2018.17070
23. DiVito B, Talavlikar R, Seifu S. Common hematologic, nutritional, asthma/allergic conditions and Lead screening/management. *Prim Care Clin Off Pract*. 2021;48(1):67-81. doi:10.1016/j.pop.2020.10.002
24. D'Amato G, Rottem M, Dahl R, et al. Climate change, migration, and allergic respiratory diseases: an update for the allergist. *World Allergy Organ J*. 2011;4(7):120-125. doi:10.1097/WOX.0b013e3182260a57

25. Lavizzo-Mourey R, Smith V, Sims R, Taylor L. Hearing loss: an educational and screening program for African-American and Latino elderly. *J Natl Med Assoc*. 1994;86(1):53-59.
26. Wallhagen MI. The stigma of hearing loss. *Gerontologist*. 2010;50(1):66-75. doi:10.1093/geront/gnp107
27. Meyer C, Hickson L, Lovelock K, Lampert M, Khan A. An investigation of factors that influence help-seeking for hearing impairment in older adults. *Int J Audiol*. 2014;53(Suppl 1):S3-S17. doi:10.3109/14992027.2013.839888

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