



Research Article

A Comprehensive, Comparative, Quality Assurance Appraisal of Local and Foreign-Born Patient Groups Utilizing a University-Based, Family Medicine Clinic

Valerie S Palmer^{1*}, Jenna M Ramaker², Carolyn Nowosielski³, Matthew Jones⁴ and Jay D Kravitz⁵

¹Department of Neurology, Oregon Health & Science University, Portland, Oregon, USA

²MPH Graduate and Postdoctoral Researcher, Department of Cell, Developmental and Cancer Biology, Oregon Health & Science University, Portland, Oregon, USA

³Adventist Health Portland, Portland, Oregon, USA

⁴Oregon Community Health Information Network, Portland, Oregon, USA

⁵Independent Public Health Consultant, Portland, Oregon, USA

Abstract

Portland, Oregon is home to a large, ethnically diverse, foreign-born population. Many seek health care from the state's principal academic health center. A suspected dearth of comprehensive information to guide healthcare services for these residents inspired this descriptive, retrospective research project. A wide-ranging, quality assurance inquiry of foreign-born medical, social, and public health needs was fashioned, moving beyond narratives that generally tend to focus on one disease entity or specific ethnic group.

Medical records of >18,000 patients were reviewed during the 26-month study period. A comparative analysis, inclusive of 14,968 U.S.-born patients and 1,294 foreign language speakers, was conducted. Initial scrutiny sought information about 102 diagnoses,

***Corresponding author:** Valerie S Palmer, Department of Neurology, Oregon Health & Science University, Portland, Oregon 97239, USA. Tel: +503-799-3932; Email: palmerv@ohsu.edu

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which included infectious diseases, chronic medical conditions, cancer, and psychiatric conditions.

Improved patient care services were the overarching goal of this project. Diagnostic comparisons between English-language and foreign-language patients were intended to guide development of best practices; assist administrators to design quality, culturally-appropriate social services; and serve as catalyst for further research concerning foreign-born healthcare needs in a moderately-sized U.S. city.

While in large measure it was determined that "common diseases" were indeed common, diagnostic and data entry improvement efforts should be directed toward understanding Country of Origin and transnational population movement influences on health; cross-cultural mental health realities; the complexities of tuberculosis; patient encounter efficiencies; multi-cultural adaptive challenges; and the importance of public health perspectives in patient management efforts. This study offers strategies and diagnostic insights, potentially missed, that may enhance a clinical evaluation.

Keywords: Country of Origin; Effective health care utilization; Foreign-born patients; Mental health; Transnational movement; Tuberculosis

Introduction

Portland, Oregon is home to a large, diverse foreign-born population. Many seek health care from the state's principal academic medical center. A suspected dearth of comprehensive information to guide healthcare services for these residents inspired this retrospective, descriptive, cohort research project. A population-based perspective, expanding knowledge and cultural awareness, would benefit a diverse, sometimes vulnerable, foreign-born population.

Study objectives sought to: 1) Describe the burden of disease among foreign-born patients seeking care at two Family Medicine and Walk-In primary care clinics; 2) Determine disease burden differences and similarities among foreign-born patient groups compared with patients born in the United States; 3) Assess data for potential public health risks from infectious/communicable diseases; 4) Identify patient care services that might benefit from a review of study observations and lessons learned.

Diagnostic comparisons between English-language and foreign-language patients were intended to guide development of best practices; assist administrators to design quality, culturally appropriate social services; and serve as catalyst for further research. A desire to identify potential health risks related to immigration patterns (whether documented or undetermined); tourism; global business travel; modes of transportation; and global zoonotic diseases added motivation for this study. Forced migration and refugee displacement history, related to climate stress, economics and conflict, was also deemed important as a means to understand the potential impact on disease patterns.

Given the realities of large-scale, transnational population movements, this study offers strategies and diagnostic insights, potentially missed, that may enhance a clinical evaluation to discern more obscure diagnoses. A query of a patient's travel history and potentially-related endemic diseases should be a routine part of a culturally relevant, review-of-systems appraisal.

Methods

This descriptive, retrospective cohort study reviewed encounter data for all patients evaluated at the Oregon Health & Science University (OHSU) Richmond Family Medicine and Walk-in Clinics between June 2013 and August 2015. Data were obtained from The Oregon Community Health Information Network (OCHIN), Inc., a health information network that manages OHSU electronic health records (EHR) [1,2]. The OCHIN technology system maintains EHR of >2.7 million patients, serving over 500 organizations and 10,000 clinicians with solutions that improve the integration and delivery of health care services. Data variables include gender, date of birth, primary spoken language, race, outpatient clinic encounters, and problem list entries of acute and chronic disease diagnoses. Personal identifiers, including names, were excluded from the provided dataset.

Medical records, obtained for all 18,128 clinic patients evaluated during the study interval, were reviewed. The dataset stratified English language speakers (defined as U.S.-born), foreign language speakers (defined as foreign-born), and patients without language information (Table 1). Foreign-born patients were defined as individuals citing a primary spoken language other than English. This definition was pragmatically chosen as a classification surrogate to stratify the patient variable – either U.S.-born or foreign-born – because Country of Origin was rarely recorded, despite availability of this medical records data field.

Data from 16,262 patients with a listed primary language preference were included in the analysis. English or American Sign Language was the primary language for 14,968 patients; 1,294 foreign language speakers were identified. Patients without a recorded language, inferred to be predominately English speakers, were excluded from the broader analysis because the study design was crafted to stratify patient categories by primary spoken language. Additionally, 22 patients who identified as Spanish-speaking American Indians and 12 who spoke Sign Language were omitted because it was unclear to what extent language served as sufficient proxy for Country of Origin.

Statistical Package for Social Sciences (SPSS) or STATA version 13.1 was employed for all analyses. Frequencies for ICD-9 diagnoses of interest were compared among language categories using chi-squared tests or Fisher's exact test, when appropriate. The study endeavored to encompass 102 diagnoses that focused on infectious diseases, sexually transmitted infections, psychiatric conditions, cancers, heart disease, hypertension, diabetes, pulmonary diseases, eye disorders, anemias, dermatological conditions, intestinal parasites, and unusual parasitic diseases. Alpha of ≤ 0.05 determined statistical significance.

Approval was obtained from the OHSU Institutional Review Board (IRB) for the use of coded data from the OCHIN electronic medical records database for all patients seen at two OHSU clinics.

Results

Medical records, obtained for all 18,128 clinic patients, documented five major language groups, including English. These groups were separately stratified to categorize and compare the most salient diagnoses and disease burden. The majority of foreign-born patients spoke Spanish, Russian, Chinese-Cantonese, or Vietnamese, although 57 languages were recognized. Interpreters were used by 69% of foreign language speakers.

Median outpatient clinic encounters were similar for foreign-language and English-speaking patients, Median=3, Wilcoxon Rank Sum Test: ($p=0.06$) (Table 1). Those without language information utilized fewer services ($n=1$; $p<0.001$). Slightly more females sought care among both cohorts. Although age distributions varied slightly, 16-40 year olds, followed by those aged 41-60, comprised the largest proportions of patients in both language groups. Diagnoses of interest, including those with a prevalence >2% and differences between English and foreign language speakers, are highlighted (Table 2).

Mental Health

Diagnoses of depression, anxiety, and post-traumatic stress disorder (PTSD) were significantly more common among English speakers, compared to foreign language speakers (Table 2).

Depression was the most prevalent mental health diagnosis, affecting 22.7% of English speakers and 11.4% of foreign-language speakers. However, striking differences existed between language groups: Depression among Vietnamese speakers was 25.2%, but much lower among Chinese-Cantonese (5.5%) speakers (Table 3).

Anxiety was significantly higher among English speakers (14.5%). While anxiety among most foreign language groups mirrored the group as a whole (5.3% combined), Russian speakers had a significantly higher percentage (11.7%) than other foreign language speakers.

Post-traumatic stress disorder, anticipated to be higher amongst refugees, asylum seekers, and immigrants, was unexpectedly and significantly lower (4.3%) compared with English speakers (6.4%). Among the foreign-born themselves, however, differences were observed. Chinese-Cantonese exhibited a prevalence of 0.8% and Spanish 0.4%.

Among foreign language speakers, mental health diagnoses were more common among women than men, a trend that generally persisted for each foreign language category. The only exception was for Chinese-Cantonese speakers, with anxiety and PTSD more common in men than women. Age stratification of adults did not reveal age-specific disease burden for any of the mental health conditions examined (data not shown).

Infectious diseases

The prevalence of malaria, HIV, Hepatitis A, and Hepatitis B was 2%. Hepatitis C was significantly lower among the foreign-born ($618/10^5$) versus English speakers ($4,025/10^5$), the former data comparable to the reported U.S. prevalence ($620/10^5$) [3,4].

Tuberculosis (TB)

A small number of active TB cases was recorded, although the prevalence was significantly higher among foreign language speakers (0.5% vs. 0.1%).

	English speakers	Foreign language speakers (FLS)	No language information available	Overall
	N = 14,968	N = 1,294	N = 1,866	N = 18,128
Gender				
Female	8,407 (56%)	739 (57%)	971 (52%)	10,117 (56%)
Male	6,561 (44%)	555 (43%)	895 (48%)	8,011 (44%)
Age				
0-15	2,148 (14%)	228 (18%)	187 (10%)	2,563 (14%)
16-40	6,333 (42%)	398 (31%)	928 (49%)	7,659 (42%)
41-60	4,446 (30%)	344 (27%)	472 (25%)	5,262 (29%)
>60	2,041 (14%)	324 (25%)	279 (15%)	2,644 (15%)
Interpreter				
yes	36 (<1%)	895 (69%)	3 (<1%)	934 (5%)
Race				
Alaskan Native	7 (< 1%)	0 (0%)	0 (0%)	7 (< 1%)
American Indian	175 (1%)	0 (0%)	0 (0%)	175 (1%)
Asian	408 (3%)	430 (33%)	78 (4%)	916 (5%)
Black	1,211 (8%)	81 (6%)	92 (5%)	1,384 (8%)
Native Hawaiian	7 (< 1%)	0 (0%)	0 (0%)	7 (<1%)
Pacific Islander	64 (<1%)	10 (<1%)	9 (<1%)	83 (<1%)
Unknown/refused	707 (5%)	134 (10%)	486 (26%)	1,327 (7%)
White	12,389 (83%)	639 (49%)	1,201 (64%)	14,229 (79%)
# Clinic Visits				
Median (range) over 26 month interval	3 (1, 303)	3 (1, 66)	1 (1, 27)	3 (1, 303)

Table 1: Descriptive statistics by primary spoken language. (Percentages may not sum to 100% due to rounding).

Variables	English Speakers	Foreign Language Speakers	Chi-Squared Test
	N=14,968	N= 1,294	p-value
	N = 14,968	N = 1,294	
Conditions of Interest	N (%)	N (%)	p-value
Mental Health			
Depression	3,405 (22.7%)	147 (11.4%)	<0.01
Anxiety	2,176 (14.5%)	69 (5.3%)	<0.01
Post-traumatic stress disorder (PTSD)	952 (6.4%)	55 (4.3%)	<0.01
Infectious Disease			
Tuberculosis (TB-active disease)	11 (0.1%)	6 (0.5%)	<0.01
Latent TB infection (LTBI)	116 (0.8%)	50 (3.9%)	<0.01
Hepatitis B	36 (0.2%)	12 (0.9%)	<0.01
Hepatitis C	522 (3.5%)	8 (0.6%)	<0.01
Cancers			
Lung	49 (0.3%)	1 (0.1%)	NS
Breast	0 (0%)	0 (0%)	NS
Cervical	25 (0.2%)	0 (0%)	NS
Liver	22 (0.1%)	1 (0.1%)	NS
Prostate	44 (0.3%)	8 (0.6%)	NS
Cardiovascular Conditions			
Heart murmur	332 (2.2%)	42 (3.2%)	<0.05
Hypertension or high blood pressure	3,075 (20.5%)	331 (25.6%)	<0.01
Diabetes			
Diabetes	1,120 (7.5%)	180 (13.9%)	<0.01

Eye Disorders			
Glaucoma	126 (0.8%)	20 (1.5%)	<0.05
Diabetic or hypertensive retinopathy	45 (0.3%)	9 (0.7%)	<0.05
Chronic Airway Diseases			
Chronic obstructive pulmonary disease (COPD)	450 (3.0%)	12 (0.9%)	<0.01
Anemia			
Unspecified	641 (4.3%)	73 (5.6%)	<0.05
Macrocytic	61 (0.4%)	6 (0.5%)	NS
Microcytic	396 (2.6%)	46 (3.6%)	NS
Sickle cell anemia	0	0	N/A
Dermatological Conditions			
Contact dermatitis	350 (2%)	36 (3%)	NS
Developmental Disorders			
Autism spectrum disorder: autistic disorder, Asperger syndrome, Pervasive developmental disorder	137 (0.9%)	3 (0.2%)	<0.05
Other			
Alcoholism	180 (1.2%)	1 (0.1%)	<0.01
Hypothyroidism	789 (5.3%)	43 (3.3%)	<0.01
Overweight or obesity	2,051 (13.7%)	119 (9.2%)	<0.01
Irritable bowel syndrome (IBS)	301 (2.0%)	5 (0.4%)	<0.01
Upper respiratory infection (URI)	79 (0.5%)	15 (1.2%)	<0.01

Table 2: Numbers & prevalence of diagnoses by language group. (NS: Not significant).

Variables	All Foreign Languages	Chinese-Cantonese		Russian		Spanish		Vietnamese	
	N=1,294 N (%)	N=127 N (%)	p-value vs other FLS	N=128 N (%)	p-value vs other FLS	N=491 N (%)	p-value vs other FLS	N=111 N (%)	p-value vs other FLS
Mental Health									
Depression	147 (11.4%)	7 (5.5%)	<0.05	11 (8.6%)	NS	42 (8.6%)	<0.05	28 (25.2%)	<0.01
Anxiety	69 (5.3%)	5 (3.9%)	NS	15 (11.7%)	<0.01	21 (4.3%)	NS	6 (5.4%)	NS
PTSD	55 (4.3%)	1 (0.8%)	<0.05	3 (2.3%)	NS	2 (0.4%)	<0.01	9 (8.1%)	NS
Infectious Disease									
Tuberculosis (TB-active disease)	6 (0.5%)	0 (0%)	NS	2 (1.6%)	NS	0 (0%)	NS	1 (0.9%)	NS
Latent TB infection (LTBI)	50 (3.9%)	2 (1.6%)	NS	9 (7%)	NS	9 (1.8%)	<0.01	6 (5.4%)	NS
Hepatitis B	12 (0.9%)	4 (3.1%)	<0.01	1 (0.8%)	NS	0 (0%)	<0.01	3 (2.7%)	NS
Hepatitis C	8 (0.6%)	0 (0%)	NS	0 (0%)	NS	2 (0.4%)	NS	1 (0.9%)	NS
Cardiovascular Conditions									
Heart murmur	42 (3.2%)	8 (6.3%)	NS	8 (6.3%)	<0.05	11 (2.2%)	NS	1 (0.9%)	NS
Congestive heart failure	25 (1.9%)	2 (1.6%)	NS	5 (3.9%)	NS	3 (0.6%)	<0.01	3 (2.7%)	NS
Hypertension/high blood pressure	331 (25.6%)	52 (40.9%)	<0.01	42 (32.8%)	<0.05	59 (12%)	<0.01	43 (38.7%)	<0.01
Diabetes									
Diabetes	180 (13.9%)	21 (16.5%)	NS	9 (7%)	<0.05	54 (11%)	<0.05	17 (15.3%)	NS
Eye Disorders									
Glaucoma	20 (1.5%)	2 (1.6%)	NS	2 (1.6%)	NS	5 (1%)	NS	5 (4.5%)	<0.01
Diabetic or hypertensive retinopathy	9 (0.7%)	1 (0.8%)	NS	1 (0.8%)	NS	3 (0.6%)	NS	2 (1.8%)	NS
Anemia									
Unspecified anemia	73 (5.6%)	6 (4.7%)	NS	8 (6.3%)	NS	22 (4.5%)	NS	13 (11.7%)	<0.05
Macrocytic	6 (0.5%)	0 (0%)	NS	1 (0.8%)	NS	1 (0.2%)	NS	1 (0.9%)	NS
Microcytic	46 (3.6%)	7 (5.5%)	NS	3 (2.3%)	NS	19 (3.9%)	NS	4 (3.6%)	NS

Dermatological Conditions									
Contact dermatitis	36 (2.8%)	7 (5.5%)	NS	3 (2.3%)	NS	7 (1.4%)	<0.05	6 (5.4%)	NS
Developmental Disorders									
Autism spectrum disorder: autistic disorder, Asperger syndrome, Pervasive developmental disorder	3 (0.2%)	0 (0%)	NS	0 (0%)	NS	0 (0%)	NS	2 (1.8%)	<0.05
Other									
Hearing loss	24 (1.9%)	3 (2.4%)	NS	4 (3.1%)	NS	4 (0.8%)	<0.05	4 (3.6%)	NS
Hypothyroidism	43 (3.3%)	5 (3.9%)	NS	11 (8.6%)	<0.01	14 (2.9%)	NS	3 (2.7%)	NS
Overweight/obesity	119 (9.2%)	2 (1.6%)	<0.01	23 (18%)	<0.01	60 (12.2%)	<0.01	8 (7.2%)	NS
Amenorrhea	7 (0.5%)	3 (2.4%)	<0.05	1 (0.8%)	NS	1 (0.2%)	NS	1 (0.9%)	NS

Table 3: Diagnoses of interest or with significant differences noted among four most common language groups, when compared to all other foreign language speakers. P-values bolded when prevalence significantly differs; NS: Not significant.

Latent TB infection (LTBI), based on screening by the Mantoux (PPD-purified protein derivative) or an interferon gamma release assay (IGRA) blood test (Quantiferon Gold or T-SPOT), was positive in 3.9% (50/1,294) of foreign-born patients. Information concerning the other 1,244 foreign language speakers was not apparent. Among English speakers, 0.8% (116/14,968) had an LTBI diagnosis. Documentation of both TB screening and expected positive LTBI results among foreign-born patients was discordantly lower compared with an earlier study (~50%) [5].

Cancers

Prevalence of lung, breast, liver, cervical, and prostate cancers was < 1%. No significant differences were detected between language groups.

Cardiovascular conditions

Typical heart-related diagnoses did not significantly differ between groups or reach a prevalence of >2%, the exception being heart murmur, which was significantly higher among foreign language speakers at 3.2%. Additionally, hypertension/high blood pressure was higher among the foreign-born (25.6%) compared with English speakers (20.5%).

Diabetes

Diabetes was more common among foreign-language speakers (13.9%) than English speakers (7.5%). Among foreign-language speakers, prevalence was significantly lower among Russian speakers (7%) and Spanish speakers (11%), compared to other foreign language speakers.

Eye disorders

Both glaucoma and retinopathies (diabetic or hypertensive) were significantly more common among foreign language speakers than English speakers. Notably, the prevalence of glaucoma among Vietnamese speakers was 4.5%, which was significantly higher than that of other foreign language speakers.

Chronic airway diseases

Chronic obstructive pulmonary disease (COPD) had a prevalence of >2% and was significantly more prevalent English speakers (3%) versus foreign-language speakers (0.9%). Other chronic airway diseases were less common among both language categories.

Anemia

Microcytic (iron deficiency), macrocytic (folate and vitamin B₁₂ deficiencies), and sickle cell anemias were assessed. Percentage-wise, anemia was relatively more common among foreign-language speakers (n=117, 9.0%), than English speakers (n=1,036, 7.0%). Microcytic anemia was variably present in 3.6% of the foreign-born and 2.6% of English speakers. Sickle cell disease was not found. Inconsistencies in recording microcytic anemia and macrocytic anemia were observed.

Dermatological conditions

Contact dermatitis was relatively common; scabies, tinea pedis, and ringworm less frequent.

Intestinal parasites

Ascariasis, trichuris, hookworm, pinworm, strongyloides, and *Giardia lamblia* diagnoses were rare; unusual parasitic diseases not detected. It was unclear whether fecal parasite screening was routine for foreign-born patients in whom a higher burden would be expected [6].

Developmental disorders

Autism spectrum disorder, which includes Asperger syndrome, autistic disorder, and pervasive developmental disorder, were significantly less common among foreign language speakers (0.2%) compared with English speakers (0.9%). While these diagnoses were fairly uncommon among foreign language speakers, they were significantly higher among Vietnamese speakers (1.8%) compared with other foreign language speakers.

Other diagnoses

Alcoholism, overweight or obesity, hypothyroidism and irritable bowel syndrome were more prevalent among English speakers, while upper respiratory infections were less common. Hearing loss, hypothyroidism, and amenorrhea significantly differed among specific language groups. Diagnoses of overweight or obesity were significantly higher among Russian (18.0%) and Spanish speakers (12.2%) and lower among Chinese-Cantonese speakers (1.6%), relative to other foreign language speakers. Malaria was not found in either cohort.

Discussion

Improved patient care services was the overarching goal of this descriptive, retrospective analysis. A comprehensive, quality assurance perspective of foreign-born medical, social, and public health needs was fashioned, moving beyond medical narratives that generally tend to focus on one disease entity or specific ethnic group. This expanded analysis with the benefit of lessons learned should translate broadly across medical delivery networks.

Changing demographic patterns in the U.S. reflect increasing numbers of foreign-born individuals. In the recent past, annually, approximately 60,000 refugees were resettled in the U.S [7]. Internal migration after resettlement can significantly complicate patient descriptive tracking efforts. Foreign-born residents comprise ~16% of the Portland metropolitan area population, representing a diverse mix of immigrants, asylees, and refugees [8]. In the early 2000s, ~1,000 refugees were annually resettled in Oregon, predominately from Russia, Somalia, Iraq, Burma, Bhutan, Cuba, and Iran [9].

Country of Origin was not recorded in the electronic health record (EHR). This information might help practitioners recognize unfamiliar or rare diagnoses amongst this complex cohort. Should an unusual or potentially contagious disease be discovered, local health department notification would facilitate a contact-tracing investigation, if necessary, to mitigate and/or prevent potential ongoing transmission.

To better appreciate historical health trends among foreign-born arrivals, refugee utilization and diagnosis research data conducted in the Portland metropolitan area in 2002 were reviewed. Expected diagnoses were present: hypertension, adult-onset diabetes, hepatitis B, intestinal parasites, dermatological conditions, and nutritional deficiencies. However, in that earlier study, TB-related diagnoses (active disease and latent infection) were significantly higher among refugees compared with U.S.-born residents. Culturally sensitive issues, unusual infectious diseases, and mental health stresses were inferred to be grossly underreported – then –and in the current study.

Utilization

Over the 26 month study period, median encounters were deemed more representative for both foreign-born and U.S.-born patients; 1.4 visits per annum. Mean encounters were somewhat higher at 2.5 and 3.1 per annum among foreign-born and U.S.-born, respectively. The Portland 2002 refugee study documented noticeably higher primary care encounters among the foreign-born, extrapolated at 18 visits per annum. Did lower utilization numbers in the current study reflect policy issues, lack of need, impediments to clinic access, incomplete documentation, health literacy knowledge gaps, or culturally unacceptable services? These unanswered questions should inspire further inquiry.

Many foreign-born patients come from countries without access to organized healthcare. They may lack an understanding about how to seek medical services in a new environment. Was transportation an issue? Did patients know how to make an appointment? A proactive approach, involving local ethnic-community entities, promotes long-term trust and equitable partnerships with their constituents, while educating them to navigate the healthcare landscape [10].

Tuberculosis

Active TB cases, although few in number, were diagnosed among

the foreign-born at a significantly higher percentage than among U.S.-born patients. Screening data for LTBI were more difficult to interpret. The low LTBI prevalence (0.8%) among English speakers was expected. It was inferred that these particular patients were considered at higher risk, based on historical or clinical information, which warranted this screening procedure.

More problematic were data concerning foreign-born patients. While those originating from foreign nations with a high prevalence of TB might be expected to have a higher risk for latent infection, Mantoux and IGRA-positive testing data, used to identify LTBI patients, were only available for 3.9% (50/1,294) of the foreign-born patients.

Without information regarding the other 1,244 foreign-born patients, it was unclear what the true burden of LTBI or subtle active disease might be in this diverse patient population. It was unknown whether screening data from Designated Civil Surgeon immigration services or other health care settings might not have been recorded in the OHSU EHR or whether TB screening was not undertaken [11].

The percentage of foreign-born patients diagnosed with LTBI in this study was inferred. This assessment is based on a review of the relatively stable number of reported TB cases in the U.S. between 2016 and 2019; approximately 9,000 annual cases. With 71% of reported TB cases in 2019 diagnosed in non-U.S.-born persons, this diverse cohort experienced a TB incidence 15 times the rate amongst U.S.-born persons [12]. These reported data and earlier research suggest that in the current study a ~50% LTBI prevalence was possible.

Given the increased risk of tuberculosis among migrants originating from countries with high rates of TB, such as poverty-stricken groups in certain low-income countries, for example, there is the need for attentive vigilance [13]. One must question whether historical information, if available, was not clearly documented in the medical record or if too few screening tests were administered. This is a compelling concern, especially regarding young children who are often close household contacts of active cases and more vulnerable to progress in a shorter time interval from acquired infection to active disease [14].

Predictive modeling mandates a scale-up of targeted LTBI testing in at-risk populations with greater attention to short-course preventive treatment regimens [15]. Without treatment, 10% of these individuals may develop TB during their life-times, attributable to latent infection reactivation [16].

Mental health

Epidemiological studies, regarding refugees and asylees resettled in Western countries, report wide variation in PTSD and major depressive disorder prevalence. Some studies describe ten times the likelihood of PTSD among refugees relative to age-matched general populations [17]. Methodologies and key risk factors, particularly traumatic events, likely influence survey variation among post-conflict populations worldwide [18].

Torture increases risk of “severe physical, psychological, social, and welfare problems” [19]. Therefore, screening for psychiatric and associated somatic illnesses (hypertension or chronic pain, for example) is prudent, since torture is the most important risk factor associated with PTSD [20].

Psychiatric data in this study were inferred to have documented lower-than-expected anxiety and PTSD burdens among foreign-born patients, compared with English-speaking patients. Given the motivational complexities for immigrating to the U.S., under-reporting could have been ~50% of actual prevalence!

Depression, a prominent contributor to the global burden of disease, provided an interesting mental health picture. Among the foreign-born, depression prevalence was 9.2% compared to 18.6% among English speakers. Yet, the construct of depression varies cross-culturally, as expressed through emotions, somatic symptoms, and coping mechanisms [21].

Notably, documented PTSD, anticipated to be higher amongst refugees, asylum seekers, and immigrants, was unexpectedly and significantly lower (4.3%) compared with English speakers (6.4%). Among the foreign-born themselves, however, differences were observed: Chinese-Cantonese speakers exhibited a prevalence of 0.8% and Spanish speakers 0.4%. PTSD diagnoses were considered under-recorded. While anxiety was also documented to be higher among English speakers than among the foreign-born, Russian speakers had a higher percentage among the latter cohort.

Multiple explanations may clarify these observations: practitioner cultural competence and/or bias; patient reticence to admit personal difficulties; family members' presence during an evaluation (children ill-suited to translate for parents or inability of female patients to be evaluated without their spouses); gender discord between patient and clinician; translation barriers; distrust of interpreter; significant delays between psychologically-related stress and appearance of somatic symptoms; or a view that one's serious distress is normal. Underreported torture or rape could be related to fear of stigma or PTSD-related memory loss [22].

Typical clinic environments may not provide optimal or suitable venues for mental health assessments. Clinic contact time constraints may limit clinicians' perception of subtle or misunderstood chief complaints. Psychiatric presentations can be complicated by health literacy limitations; cultural views that depression is considered weakness; and/or privacy concerns [23,24]. Psychotherapy specialty referrals can provide patients of similar ethnic backgrounds with culturally appropriate care [25].

Developmental disorders

Autism spectrum disorder (ASD) is an encompassing diagnostic category that includes autistic disorder, Asperger syndrome, and the general classification of pervasive developmental disorder. The ASD is characterized by delays in the development of socialization and communication skills. While symptoms may begin in infancy, the typical age of onset is before 3 years of age. Symptoms may include problems with understanding and using language and nonverbal communication; difficulties during social interactions with people and events; trouble with changes in routines and familiar surroundings; and repetitive body movements or behavior patterns [26].

Data on the prevalence of ASD in the U.S. population is complex. The number of mental health disorders/diseases, included under ASD, in addition to misdiagnosis and health disparities, is further complicated by language, assimilation, and other factors that make it difficult to determine expected/unexpected rates regarding English vs. foreign-born language speakers [27].

In this study, <1% of the English speaking cohort had an ASD, most under the age of 40. Only 3 younger foreign-born patients (0.2%) were given this broad categorical diagnosis. In general, one could reasonably assume that this behavioral disorder would not be easily recognized in many foreign-born youth due to social or cultural recognition dissimilarities between patients (along with their parents) and their health care provider. Reticence to express oneself or varied cultural issues would likely have obscured an ASD diagnosis in older people.

Health literacy

Beyond considerations of the strengths and weaknesses of diagnostic data, patients' health literacy aptitudes may present a communications challenge during interactions with health care providers. Cultural differences should be anticipated when discussing diagnoses, treatment rationale, healthcare goals, and expectations. Foreign-born patients may be reluctant to seek medical care, having limited understanding of disease concepts.

Fear of hospitalization may be expressed with the misconception that people only go to hospitals as a last resort or to die. Medications may be used incorrectly or stopped prematurely without appreciating their purpose. To counter these issues and improve diagnostic accuracy, health professionals and health care systems must be cognizant of how culture, religion, health practices, and diseases impact conduct within various foreign-born communities [28].

Diagnostic issues

Assessing Country of Origin and travel histories expand the differential diagnosis list. A more cost-effective, investigative strategy is operative when pre-test probabilities are incorporated. If patients originate from schistosomiasis-endemic regions, urine hematuria screening should be routine during an initial evaluation. Fever of unknown origin among the foreign-born has an expanded list of etiologies, including arboviruses, plasmodium, parasites, rickettsia, zoonotic diseases, and Mycobacteria [29]. As an example, a disproportionate percentage of TB was diagnosed among older Asians brought to Oregon to live with their adult, immigrant children. With aging a risk factor for TB reactivation, fever of unknown etiology in patients originating from countries categorized as higher risk should be screened, regardless of U.S. date of entry.

Strengths and weaknesses

Inferentially, LTBI, mental health traumas, and intestinal parasite diagnoses were under-recorded; and anemia diagnoses not always clearly documented. It was recognized that minor misclassifications within the two stratified cohorts may have occurred by employing language as a pragmatic surrogate for electronically identifying patient origins. But, Country of Origin was not documented in the EHR, reportedly over privacy concerns—a noteworthy omission. Excluding those without a primary language designation from the broader analysis, considered missing data, was unlikely to have biased study conclusions or lessons learned to a noteworthy degree.

Generalizations about disease trends should be posed carefully among different language groups. While population-based conclusions might be drawn about the burden of diseases in Oregon, residents elsewhere in the U.S. could have different complaints. The analysis presented in this study only contained information recorded

by two OHSU clinics, serving an unknown percentage of Oregonians. Data showed the number of patients diagnosed with various illnesses, while highlighting differences in disease rates among English vs. foreign-born speakers. These limited data do not allow for broader conclusions, other than the need for additional research on these questions.

It is also necessary to remember that, although it is important to consider obscure diseases not normally seen to explain a patient's chief complaints, clinicians should still begin evaluations with the basics.

Lessons learned

This study offers clinical, historical, social, cultural, and public health perspectives intended to enhance effective health care services. In general, more research is needed to better understand the demographic patterns (numbers and age breakdown) of patients seeking care, as well as the expected and unexpected rates of all diseases for English vs. foreign-born speakers, whether located in Oregon or across the U.S. population landscape.

Transnational history

A. Documentation of transnational movement motives and travel history should include tourism, global business travel; modes of transportation; related risk of global zoonotic disease carriage and contagion; country origins of forced migration/refugee displacement; and displaced persons transit center locations [30,31]. These data should be obtained for all patients, potentially pertinent to a chief complaint [32]. This information may provide subtle diagnostic clues regarding less recognizable, imported maladies.

B. Verifying Country of Origin should motivate clinicians to consider non-U.S.-endemic diseases; guide appropriate services; and contribute to public health surveillance efforts.

B.1. Prior to practitioner encounters, foreign-born patients should complete a review-of-systems – in their primary language – with an interpreter, who might uncover potential or existing health problems. Queries should include countries of transient or prolonged residence. Identifying primary language will guide clinic staffing and appropriate social interactions. Pre-encounter efforts can guide clinician inquiry and expectantly lead to more effective outcomes.

B.2. Awareness of endemic infectious and non-infectious diseases in specific geographical areas is essential, i.e., schistosomiasis in sub-Saharan Africa and South Asia and Konzo in Central-West Africa, respectively; zoonotic diseases more globally widespread; and the potential for outbreaks of viral diseases yet to emerge [33,34].

Ethnically-oriented, community-based social networks can assist inexperienced foreign-born patients to access supportive, acceptable, and timely healthcare.

Mental health

A. Clinicians should be cognizant of possible associated somatic and psychiatric co-morbidities disproportionate among foreign-born patients. These etiological relationships may be more difficult to recognize when a stressful mental trauma has been suppressed for an extended period of time.

B. A psychiatric consultation should be initiated if significant mental health problems are suspected or diagnosed.

Public health

A. All trainees and staff should be knowledgeable of national or local public health reporting requirements, which may vary depending on location [35].

B. Documenting TB status of patients from high-risk countries should be a priority, given the WHO estimate that more than 1.5 million people died from TB in 2018 [36,37].

C. TB screening results, based on the PPD skin test method or an IGRA blood test, should reside indefinitely on the EHR problem list [38]. Included should be the test results for foreign-born patients evaluated initially through the Civil Surgeon immigration public health TB screening program. If a Bacillus Calmette–Guérin (BCG) vaccine was previously given, this fact should also be noted in the medical record. All of this historical information can guide endorsement or exclusion of further diagnostics or treatment.

D. While no cases of malaria were found, this particular vector-borne, parasitic disease should be included on an initial differential diagnosis list when evaluating foreign-born patients with a fever. Obtaining a travel history is important because some of these patients may have traveled to their Country of Origin in a malaria zone to visit family or friends and chose not to take prophylaxis because of a misconception that they are immune due to childhood exposures.

E. Vaccination status of all patients should be evaluated; foreign-born coverage inferred more likely to be incomplete [39].

Data and clinical considerations

A. Improved clerical data clarity and accuracy in documenting diagnostic and procedural activities in the EHR would be a prudent administrative goal, which should allow for enhanced practitioner efficiencies and successful, focused patient-centered care.

B. Given the sometimes subtle and complicated manifestations of mental health and tuberculosis signs and symptoms, these two diagnostic categories should motivate increased reflection if concerns arise during a clinical encounter.

C. Obtaining family, environmental exposure, and occupational histories may provide insight regarding pre-entry sources of chronic illness or disability.

D. Stool ova and parasite initial screening should be routine for foreign-born patients.

E. Consistent classification of anemia is warranted.

F. Diagnostic and/or documentation delays, conceivably influenced by cultural or social issues - or a patient's lack of understanding of the origins of illness, injury, or disability –must be considered in the management of a diverse patient population.

Conclusion

Given the realities of large-scale, transnational population movements, this study provided strategies and diagnostic insights, potentially missed, to enhance a clinical evaluation. This study was prompted by a desire to understand how immigration patterns,

whether documented or undetermined; tourism; global business travel; modes of transportation; risk of global zoonotic disease carriage and contagion; and forced migration/refugee displacement related to climate stress, economics, or conflict might impact disease patterns. Diagnostic and therapeutic intentions, especially related to mental health burden, tuberculosis, parasite screening, and the potential for imported endemic/pandemic diseases, would benefit from increased attention to detail.

A query of one's Country of Origin, and/or travel and employment history should be a routine part of a culturally relevant, review-of-systems appraisal. Without this strategy, accurate diagnoses, at times, can be a more tenuous proposition. Added benefit can be gained by taking cues from patients from varied backgrounds about how to proceed with a consultation.

One should keep in mind that, while discerning more challenging, possibly imported diagnoses, it is important to remember that "common disease are common." Nevertheless, curiosity and acumen about foreign-born patients promotes valued access to effective health care. This approach should lead to more efficient clinic utilization, while allotting sufficient time to work through cultural differences in the understanding and expression of patient maladies and subsequent proposed social guidance and medical care interventions.

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