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Characteristics of patients seen at a dermatology free clinic, 2017-2020: a retrospective chart review

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To the Editor:

Free medical clinics have become increasingly widespread as the number of uninsured Americans rises [1]. In free clinics across the United States (US), patients, in addition to being uninsured, are more likely to be non-citizens, homeless, and of racial and ethnic minorities limited in English proficiency [2]. Many of these patients rely solely on free clinic services and there is a clear need for more research regarding free clinics to improve health care access in underrepresented communities.

Most free clinics across the US focus on primary and preventive medical care [3]. However, many issues that arise in these primary care settings are more appropriately addressed by a specialist. Dermatologic care is especially limited at free clinics, with recent studies showing a significant lack of access to dermatology services [4]. The purpose of this study was to characterize the patient population attending the free, student-run Paul Hom Asian Clinic (PHAC) at the University of California, Davis to better meet the needs of this population. As PHAC is one of the only free clinics in Sacramento providing dermatology services, we aimed to understand how patient demographics affect access to dermatologic care. Additionally, prior research has shown a strong association between Asian descent and certain skin conditions such as eczema, a very prevalent skin disease in the US [5,6]. In fact, eczema has been found to be more prevalent in Asians than in Caucasians, despite a predominance of studies on the latter [7]. By characterizing demographics, diagnoses, and treatments among the PHAC cohort, we sought to identify disease associations within an underserved and predominantly Asian patient population.

This study was approved by the University of California, Institutional Review Board. Patients of all ages attending PHAC for dermatologic care from September 2017 to September 2020 were included. Besides having a skin-related chief complaint, there were no other inclusion criteria. Multiple encounters by the same patient were included only if the complaints were unique. That is, follow-up visits for previous diagnoses were excluded. A total of 94 physical charts were accessed for individual patients, and 109 encounters were included.

Demographic parameters extracted were gender, age, race and ethnicity, language spoken, 5-digit ZIP code, and insurance status. Using US census data 5-year estimates, median income (in 2018 inflation-adjusted dollars) and poverty rate (population percentage under federal poverty line) were recorded for each ZIP code. Distance traveled was estimated as the shortest route by car from ZIP code area to PHAC using Google Maps. Demographic variables were then compared to diagnosis and treatment. Because of the large number of race and ethnicity categories that were recorded, they were grouped into three major categories: Chinese, Other Asian, and Non-Asian. Diagnoses and treatments were also grouped into major categories (**Table 1A**,

Table 2. *Student's t-tests comparing average median household income, average distance traveled versus age, gender, language.*

		Average median household income	t	P value	Average distance traveled (miles)	t	P value
Age (years)	<50 (N=49)	$59,903.38	-0.707	0.481	12.4	-0.886	0.378
	≥50 (N=60)	$62,781.85			15.0		
Gender	Male (N=48)	$62,171.54	0.303	0.763	12.6	-0.729	0.468
	Female (N=61)	$60,936.56			14.8		
Race/ Ethnicity	Non-Asian (N=24)	*$51981.46*	**n^2**	0.025*	11.9	**n^2**	0.255
	Chinese (N=53)	*$61,750.41*	0.069		13.2	0.026	
	Other Asian (N=32)	**$67,597.72**			17.5		
Language	Non-English (N=68)	$63,457.71	**t**	0.195	14.7	**t**	0.427
			1.305			0.798	
	English (N=41)	$58,060.69			12.4		

*ANOVA was used only for Race/Ethnicity, given three instead of two categorical groups. t is the test statistic for t-tests; n^2 is the test statistic for ANOVA. * denotes a result is significant at P<0.05. For comparison bold text emphasizes notable high values with respect to relative low values (italic text).*

1B). Less common diagnoses and treatments were analyzed together in their respective "Other" categories.

We analyzed for associations between categorical variables using chi-square tests of independence. For associations between a categorical variable and a quantitative variable such as median income, we used Student's t-test or analysis of variance (ANOVA). For all chi-square, t-test, and ANOVA statistics, P<0.05 was considered significant.

Between September 2017 and September 2020, there were 109 patient encounters with skin-related chief complaints documented in PHAC physical charts. We stratified diagnosis and treatment associations based on patient age, gender, race/ethnicity, language spoken, income area, distance traveled, and insurance status, summarized in Tables 1A and 1B.

Age and gender

The age range for our study population was between 12 and 78 years old, with the mean at 50 years of age. Fifty five percent of the patients were ≥50 years old and 45% of the patients were <50 years old. For patients ≥50 years old, the average median household income was $62,782 and the average distance traveled to the clinic was 15 miles. For patients <50 years old, the average median household income was $59,903 and the average distance traveled to the clinic was 12.4 miles. There was no significant association when comparing age against median household income (P=0.481) or against distance traveled (P=0.378), (**Table 2**). Additionally, there was a higher proportion of eczema diagnoses in the ≥50 age group (65.2% of all eczema cases) compared to the <50 age group (34.8%), but this was not significant (P=0.192), (**Table 3A)**. For treatments, topical corticosteroids were the most often prescribed in both groups, but significantly more frequently prescribed in the ≥50 group (67.4%) compared to the <50 group (32.6%), (P=0.0473). Antimicrobials were also more frequently prescribed in patients <50 years old compared to patients ≥50 years old (P=0.0415), (**Table 3A)**.

For gender, 44% of the patients were male and 56% were female. The average ZIP code median household income was $62,172 for males and $60,937 for females. The average distance traveled to the clinic was 12.64 miles for males and 14.83 miles for females. No significant association was found between gender and median household income (P=0.763) or distance traveled (P=0.468), (**Table 2**). Females made up 70.8% of Non-Asian, 43.8% of Other Asian, and 56.6% of Chinese patients, and 60.3% of male patients and 39.7% of female patients did not speak English (**Table 3B)**. Eczema was the most frequent diagnosis in both genders. In contrast, significantly more males were diagnosed with psoriasis than females (P=0.0463), (**Table 3B)**.

Table 3A. *Chi-squared tests comparing age versus diagnosis, treatment.*

		Age (years)		χ^2	P value
		<50	≥50		
Diagnosis	Eczema (n=23)	*8 (34.8)*	**15 (65.2)**	1.703	0.192
	All Non-Eczema Diagnoses (n=90)	45 (50.0)	45 (50.0)		
	Infectious Cause (n=22)	11 (50.0)	11 (50.0)	0.105	0.746
	All Non-Infectious Diagnoses (n=91)	42 (46.2)	49 (53.8)		
	Fungal Infection (n=11)	7 (63.6)	4 (36.4)	1.370	0.242
	All Non-Fungal Diagnoses (n=102)	46 (45.1)	56 (54.9)		
Treatment	Topical Steroids (n=43)	*14 (32.6)*	**29 (67.4)**	3.936	0.0473*
	All Non-Topical Steroid Treatments (n=103)	52 (50.5)	51 (49.5)		
	Antimicrobial (n=29)	**18 (62.1)**	*11 (37.9)*	4.155	0.0415*
	All Non-Antimicrobial Treatments (n=117)	48 (41.0)	69 (59.0)		

*χ^2 is the chi-square value (with one degree of freedom) after two by two tests of independence between rows and columns. * denotes a result is significant at P<0.05. For comparison bold text emphasizes notable high values with respect to relative low values (italic text).*

Table 3B. *Chi-squared tests comparing gender versus race/ethnicity, diagnosis, treatment.*

		Gender		χ^2	P value
		Male	Female		
Race/ Ethnicity	Non-Asian (n=24)	7 (29.2)	17 (70.8)	4.099	0.251
	Chinese Asian (n=53)	23 (43.4)	30 (56.6)		
	Other Asian (n=32)	18 (56.3)	14 (43.8)		
Language	Non-English (n=68)	41 (60.3)	27 (39.7)	1.376	0.241
	English (n=41)	20 (48.8)	21 (51.2)		
Diagnosis	Eczema (n=23)	12 (52.2)	11 (47.8)	0.0346	0.852
	All Non-Eczema Diagnoses (n=90)	45 (50.0)	45 (50.0)		
	Infectious Cause (n=22)	7 (31.8)	15 (68.2)	2.217	0.136
	All Non-Infectious Diagnoses (n=91)	45(49.5)	46 (50.5)		
	Fungal Infection (n=11)	4 (36.4)	7 (63.6)	0.457	0.499
	All Non-Fungal Diagnoses (n=102)	48 (47.1)	54 (52.9)		
	Psoriasis (n=9)	**7 (77.8)**	*2 (22.2)*	3.971	0.0463*
	All Non-Psoriasis Diagnoses (n=104)	45 (43.3)	59 (56.7)		
Treatment	Topical Steroids (n=43)	**24 (55.8)**	*19 (44.2)*	4.445	0.0350*
	All Non-Topical Steroid Treatments (n=103)	38 (36.9)	65 (63.1)		
	Antimicrobial (n=29)	8 (27.6)	21 (72.4)	3.279	0.0702
	All Non-Antimicrobial Treatments (n=117)	54 (46.2)	63 (53.8)		
	Dry Skin Care (n=16)	4 (25.0)	12 (75.0)	2.244	0.134
	All Non-Dry Skin Care Treatments (n=130)	58 (44.6)	72 (55.4)		

*χ^2 is the chi-square value (with one degree of freedom) after two by two tests of independence between rows and columns. * denotes a result is significant at P<0.05. For comparison bold text emphasizes notable high values with respect to relative low values (italic text).*

Topical corticosteroids were the most prescribed treatment in both genders. Interestingly, they were prescribed at a significantly higher rate in males (P=0.0350), (**Table 3B**).

Race and ethnicity

Almost half of our patients were Chinese (48.6%) followed by Other Asian (29.4%), and Non-Asian (22.0%). A significant difference was found in the ZIP code median incomes among the three groups (P=0.025), with Other Asians living in higher median income areas compared to Non-Asians (**Table 2**). There was also a significant association between race/ethnicity and language spoken (P<0.0001), with Non-Asian patients more likely English-speaking and Chinese patients more likely non-English-speaking (**Table 4A**). Additionally, fungal skin infections were

Table 4A. *Chi-squared tests comparing race/ethnicity versus distance traveled, language, diagnosis, treatment.*

		Race/Ethnicity			χ^2	P value
		Non-Asian	Chinese Asian	Other Asian		
Distance Traveled (mi)	0-9.99 (N=41)	10 (24.4)	17 (41.5)	14 (34.2)	3.569	0.467
	10-19.99 (N=48)	10 (20.8)	27 (56.3)	11 (22.9)		
	20.00+ (N=18)	2 (11.1)	9 (50.0)	7 (38.9)		
Language	Non-English (N=68)	4 (5.9)	45 (66.2)	19 (27.9)	32.956	<0.0001*
	English (N=41)	**20 (48.8)**	*8 (19.5)*	*13 (31.7)*		
Diagnosis	Eczema (N=23)	3 (13.0)	12 (52.2)	8 (34.8)	1.642	0.440
	All Non-Eczema Diagnoses (N=90)	21 (23.3)	43 (47.8)	22 (24.4)		
	Infectious Cause (N=22)	3 (13.6)	11 (50.0)	8 (36.4)	1.111	0.574
	All Non-Infectious Diagnoses (N=91)	21 (23.1)	44 (48.4)	26 (28.6)		
	Fungal Infection (N=11)	*1 (9.1)*	*3 (27.3)*	**7 (63.6)**	6.552	0.0378*
	All Non-Fungal Diagnoses (N=102)	23 (22.5)	52 (51.0)	27 (26.5)		
	Benign Growth (N=12)	7 (58.3)	3 (25.0)	2 (16.7)	11.048	0.00399*
	All Non-Benign Growth Diagnoses (N=101)	17 (16.8)	52 (51.5)	32 (31.7)		
Treatment	Topical Steroid (N=43)	6 (14.0)	22 (51.2)	15 (34.9)	1.900	0.387
	All Non-Topical Steroid Treatments (N=103)	22 (21.4)	55 (53.4)	26 (25.2)		
	Antimicrobial (N=29)	6 (20.7)	10 (34.5)	13 (44.8)	5.944	0.0512
	All Non-Antimicrobial Treatments (N=117)	22 (18.8)	67 (57.3)	28 (23.9)		
	Conservative Treatment (N=25)	5 (20.0)	17 (68.0)	3 (12.0)	4.121	0.127
	All Non-Conservative Treatments (N=121)	23 (19.0)	60 (49.6)	38 (31.4)		
	Referral (N=11)	5 (45.5)	6 (54.5)	0 (0.0)	7.631	0.0220*
	All Non-Referral Treatments (N=135)	23 (17.0)	71 (52.6)	41 (30.4)		

*χ^2 is the chi-square value (with one degree of freedom) after two by two tests of independence between rows and columns. * denotes a result is significant at P<0.05. For comparison bold text emphasizes notable high values with respect to relative low values (italic text).*

Table 4B. *Chi-squared tests comparing Language versus distance traveled, diagnosis, treatments.*

		Language		χ^2	P value
		Non-English	English		
Distance Traveled (mi)	0-9.99 (N=41)	24 (58.5)	17 (41.5)	2.041	0.360
	10-19.99 (N=48)	30 (62.5)	18 (37.5)		
	20.00+ (N=18)	14 (77.8)	4 (22.2)		
Diagnosis	Eczema (N=23)	7 (73.9)	6 (26.1)	0.250	0.617
	All Non-Eczema Diagnoses (N=90)	55 (61.1)	35 (38.9)		
	Infectious Cause (N=22)	14 (63.6)	8 (36.4)	0.0001	0.993
	All Non-Infectious Diagnoses (N=91)	58 (63.7)	33 (36.3)		
	Fungal Infection (N=11)	7 (63.6)	4 (36.4)	0	0.995
	All Non-Fungal Diagnoses (N=102)	65 (63.7)	37 (36.3)		
	Benign Growth (N=12)	*4 (33.3)*	**8 (66.7)**	5.361	0.0206*
	All Non-Benign Growth Diagnoses (N= 101)	68 (67.3)	33 (32.7)		
Treatment	Topical Steroid (N=43)	30 (69.8)	13 (30.2)	0.771	0.380
	All Non-Topical Steroid Treatments (N=103)	64 (62.1)	39 (37.9)		
	Antimicrobial (N=29)	18 (62.1)	11 (37.9)	0.0845	0.771
	All Non-Antimicrobial Treatments (N=117)	76 (65.0)	41 (35.0)		

*χ^2 is the chi-square value (with one degree of freedom) after two by two tests of independence between rows and columns. * denotes a result is significant at P<0.05. For comparison bold text emphasizes notable high values with respect to relative low values (italic text).*

more commonly diagnosed in Other Asians than in Non-Asian or Chinese patients (P=0.0378). Benign skin growths were more common in Non-Asian than in Chinese or Other Asian patients. (P=0.00399), (**Table 4A**). There was no significant association between race/ethnicity and eczema.

Language

More than half of patients were non-English speaking (62.4%). Non-English-speaking patients were more likely to come from higher median income areas than were English speaking patients, but this was not significant. There was also no association between language and distance traveled (**Tables 2, 4B)**. Benign skin growths were more common in English-speaking patients than in non-English speaking patients (P=0.0206), but there was no significant association between other diagnoses as well as treatments (**Table 4B)**.

Income, distance traveled

50.5% of patients were from $45,000-$89,999 median household income ZIP code areas, 32.7% were from <$45,000 areas, and 16.8% from ≥$90,000 areas. There was a significant association between median household income and all infectious causes (P=0.0153), (**Table 5A)**, which can be attributed to the disproportionately higher number of fungal skin infections in the <$45,000 median household income group (P=0.0476). There was also a significant association between median household income and dry skin care (P=0.0253), (**Table 5A)**, with dry skin care more frequently prescribed to patients in the $45,000-$89,999 median household income group. Eczema was most frequently diagnosed among the lower median household income groups (<$90,000), whereas allergic skin reaction was most often diagnosed for the ≥$90,000 group. Topical steroids were the most prescribed treatment across all median household income groups.

For the distance traveled to PHAC, 44.9% of patients traveled 10-19.99 miles, 38.3% traveled <10 miles, and 16.82% traveled ≥20 miles. There was no significant association between distance traveled and any of the diagnoses or treatments (**Table 5B)**. Eczema was most frequently diagnosed across the shorter distance traveled groups (<20 miles), whereas psoriasis, fungal skin infections, and allergic skin reactions were more frequently diagnosed in the ≥20 miles group. Similarly, topical corticosteroids were the most frequently prescribed treatment across the shorter distance traveled groups (<20 miles), antimicrobials were most frequently prescribed in the ≥20 miles group.

Insurance status

Although 52.3% of all patients in our study were uninsured, 47.7% were insured. Of the 47.7% with insurance, half had Medi-Cal, whereas the other half had some other form of insurance. Uninsured patients were 50% male and 54.1% female but there was no significant association between gender and insurance status (P=0.699), (**Table 5C)**. There was a significant association between insurance status and race/ethnicity (P=0.00873) given the disproportionately higher proportion of uninsured Non-Asian patients (79.2%) compared to Other Asian (53.1%) and Chinese (39.6%) patients. The proportion of patients with non-Medi-Cal insurance was highest in Chinese (39.6%) followed by Other Asian (21.8%) and Non-Asian (4.2%) patients (**Table 5C)**. There were no significant associations between insurance status and any diagnoses or treatments. Eczema was the most common diagnosis and topical corticosteroids were the most common treatment across all insurance status groups.

The epidemiology of eczema in US adults is well documented, with eczema generally being more prevalent in women and older adults (age 62 and over in the Silverberg and Hanifin US population-based study), [8]. In an international survey by Barbarot et al., there was regional variability among different countries, but eczema prevalence was similarly higher in females than in males. However, prevalence generally decreased with age and was lowest among the 55-65 age group across all the countries studied [9]. Within the PHAC cohort, we saw more eczema cases diagnosed in the >50 group, though this was not significant. However, case prevalence was split almost equally between men and women. Because PHAC serves a majority Asian population, it is necessary to consider that disease demographics of our cohort may vary from those of free clinics across the US, in which Asians are generally considered a minority population. Asians are also considered a minority population in all the countries studied in the Barbarot international survey, except for Japan [9]. Clearly, there is a need for more research on eczema in Asian populations.

Table 5A. *Chi-squared tests comparing median household income versus diagnosis, treatment.*

		Median Household Income			χ^2	P value
		$0.00-$44,999.99	$45,000-$89,999.99	$90,000.00+		
Diagnosis	Eczema (N=23)	7 (30.4)	13 (56.5)	3 (13.0)	0.719	0.698
	All Non-Eczema Diagnoses (N=88)	29 (33.0)	42 (47.7)	17 (19.3)		
	Infectious Cause (N=21)	**12 (57.1)**	*5 (23.8)*	*4 (23.8)*	8.355	0.0153*
	All Non-Infectious Diagnoses (N= 90)	24 (26.7)	50 (55.6)	16 (17.8)		
	Fungal Infection (N=11)	**7 (63.6)**	*2 (18.2)*	*2 (18.2)*	6.091	0.0476*
	All Non-Fungal Diagnoses (N=100)	29 (29.0)	53 (53.0)	18 (18.0)		
	Other (N=9)	1 (11.1)	8 (88.9)	0 (0.0)	6.197	0.0451*
	All Diagnoses Except Others (N=102)	35 (34.3)	47 (46.1)	20 (19.6)		
Treatment	Topical Steroid (N=43)	13 (30.2)	21 (48.8)	9 (20.9)	1.302	0.521
	All Non-Topical Steroid Treatments (N=101)	37 (36.6)	50 (49.5)	14 (13.9)		
	Antimicrobial (N=29)	13 (44.8)	11 (37.9)	5 (17.2)	2.057	0.357
	All Non-Antimicrobial Treatments (N=115)	37 (31.6)	60 (51.3)	18 (15.4)		
	Dry Skin Care (N=16)	*2 (12.5)*	**13 (81.3)**	*1 (6.3)*	7.351	0.0253*
	All Non-Dry Skin Care Treatments (N=128)	48 (37.5)	58 (45.3)	22 (17.2)		

*χ^2 is the chi-square value (with one degree of freedom) after two by two tests of independence between rows and columns. * denotes a result is significant at P<0.05. For comparison bold text emphasizes notable high values with respect to relative low values (italic text).*

Table 5B. *Chi-squared tests comparing distance traveled versus diagnosis, treatment.*

		Distance Traveled (mi)			χ^2	P value
		0.00-9.99	10.00-19.99	20.00+		
Diagnosis	Eczema (N=23)	**11 (47.8)**	**11 (47.8)**	*1 (4.3)*	4.345	0.114
	All Non-Eczema Diagnoses (N=88)	28 (31.8)	41 (46.6)	19 (21.6)		
	Infectious Cause (N=21)	8 (38.1)	8 (38.1)	5 (23.8)	0.970	0.616
	All Non-Infectious Diagnoses (N= 90)	31 (34.4)	44 (48.9)	15 (16.7)		
	Fungal Infection (N=11)	*3 (27.3)*	*5 (45.5)*	**3 (27.3)**	0.800	0.670
	All Non-Fungal Diagnoses (N=100)	36 (36.0)	47 (47.0)	17 (17.0)		
Treatment	Topical Steroid (N=43)	**13 (30.2)**	**24 (55.8)**	*6 (14.0)*	3.628	0.163
	All Non-Topical Steroid Treatments (N=101)	42 (41.6)	39 (38.6)	20 (19.8)		
	Antimicrobial (N=29)	*10 (34.5)*	*11 (37.9)*	**8 (27.6)**	2.239	0.326
	All Non-Antimicrobial Treatments (N=115)	45 (39.1)	52 (45.2)	18 (15.7)		

*χ^2 is the chi-square value (with one degree of freedom) after two by two tests of independence between rows and columns. * denotes a result is significant at P<0.05. For comparison bold text emphasizes notable high values with respect to relative low values (italic text).*

Research on eczema has been done in different regions in Asia, but different diagnostic criteria for eczema between individual Asian countries make comparing epidemiologic and clinical data challenging [6,7]. Generally, studies show substantial variation in eczema prevalence across different Asian countries, ranging from 2.6% in South Korea to 11% in Singapore [7]. There are also ethnic differences in clinical findings and severity of eczema. For example, one study showed that individuals in East Asia had more erythroderma whereas those from Southeast Asia had more exudative eczema, prurigo nodularis, and lichenification. East Asians also had more extensor, scalp, and auricle involvement [10]. Treatment options among Asian countries also vary, generally following the Western paradigm but tailored to be region-specific. For example, wet-wrap therapy may be less helpful in humid countries like Taiwan, and phototherapy is not typically recommended in Southeast Asian countries owing to limited access [6]. Thus, more research accounting for the regional or ethnic differences of eczema could be beneficial for US providers in optimizing care for Asian patients, a population which is rapidly

Table 5C. *Chi-squared tests comparing insurance status versus gender, race/ethnicity, diagnosis, and treatment.*

		Insurance Status			χ^2	P value
		Uninsured	Insured with Medi-Cal	Insured without Medi-Cal		
Gender	Male (N=48)	24 (50.0)	14 (29.2)	10 (20.8)	1.430	0.699
	Female (N=61)	33 (54.1)	12 (19.7)	16 (26.2)		
Race / Ethnicity	Non-Asian (N=24)	**19 (79.2)**	4 (16.7)	*1 (4.2)*	13.590	0.00873*
	Chinese Asian (N=53)	*21 (39.6)*	11 (20.8)	**21 (39.6)**		
	Other Asian (N=32)	*17 (53.1)*	8 (25.0)	*7 (21.9)*		
Diagnosis	Eczema (N=23)	11 (47.8)	5 (21.7)	7 (30.4)	0.499	0.779
	All Non-Eczema Diagnoses (N=90)	48 (53.3)	21 (23.3)	21 (23.3)		
	Infectious Cause (N=22)	12 (54.5)	5 (22.7)	5 (22.7)	0.75821	0.963
	All Non-Infectious Diagnoses (N=91)	47 (51.6)	21 (23.1)	23 (25.3)		
	Fungal Infection (N=11)	6 (54.5)	3 (27.3)	2 (18.2)	0.323	0.851
	All Non-Fungal Diagnoses (N=102)	53 (52.0)	23 (22.5)	26 (25.5)		
Treatment	Topical Steroid (N=43)	22 (51.2)	8 (18.6)	13 (30.2)	2.239	0.326
	All Non-Topical Steroid Treatments (N=103)	52 (50.5)	27 (26.2)	24 (23.3)		
	Antimicrobial (N=29)	18 (62.1)	5 (17.2)	6 (20.7)	1.918	0.383
	All Non-Antimicrobial Treatments (N=117)	56 (49.6)	30 (25.2)	31 (26.1)		

*χ^2 is the chi-square value (with one degree of freedom) after two by two tests of independence between rows and columns. * denotes a result is significant*

growing. In fact, Asian Americans are the fastest growing major racial group in the US and projected to be the country's largest immigrant group by 2055 [11].

It is also well documented that eczema is associated with higher income [12,13]. However, in our study population we observed that eczema was only the most common diagnosis among the lower income groups. This may be explained by differential health care utilization based on severity of eczema symptoms. A 2019 cross-sectional study by Silverberg et al. reported that outpatient utilization for eczema in US adults was low but increased with disease severity. It also found that urgent care and emergency visits for eczema were more common among lower income individuals [14]. It is likely that among lower income individuals, those who visit PHAC may have milder eczema symptoms, whereas those with more severe eczema may utilize urgent care or emergency services instead. Mild symptoms are more likely treated with dry skin care, which we observed to be recommended significantly more often for one of the lower income groups. Higher income individuals may utilize outpatient services outside of PHAC for long-standing mild eczema but visit PHAC for more acute symptoms of allergic skin reaction, the diagnosis we observed the most in our highest income group. Differential healthcare utilization may also explain why eczema was the most common diagnosis among patients who traveled only under 20 miles to get to PHAC. Those with mild disease living over 20 miles away may not feel their symptoms are serious enough to warrant travel cost and time, and those with more severe disease may find it necessary to go directly to the hospital.

Socioeconomic disparities have also been well documented in the epidemiology of infectious diseases. Populations with significant financial barriers to health care, such as immigrants, migrant workers, and low-income individuals are more susceptible to preventable infections or worse outcomes after treatment [15,16]. Our study population similarly demonstrated a significant association between patients from low median household income geographic areas and rate of infectious skin disease, especially fungal skin infection. Though geography and environment have

been shown to play a role in the prevalence of cutaneous mycoses, studies have also identified socioeconomic vulnerability as a factor [17,18]. In homeless and migrant worker populations, this vulnerability has been attributed to poor living and working conditions that limit proper sanitation and personal hygiene [19]. The higher rate of fungal skin infections in our low median household income group may similarly relate to occupational conditions which facilitate fungal growth, like working in humid environments or in damp footwear all day.

Although we did not find race and language disparities within our cohort for eczema, significant associations were noted for benign skin lesions, which were more common in the Non-Asian group than in the Other Asian and Chinese groups. Benign skin growths were also more common in English-speaking than in non-English-speaking patients, but this was not surprising as the Non-Asian group had a significantly higher percentage of English-speakers. Seborrheic keratosis, one of the most common benign skin lesions in the US, are more frequent in Caucasians than in those of darker skin types [20]. In contrast, people of darker skin types, including those of Asian, Hispanic, and African descent, have higher incidence of keloids and hypertrophic scars [21,22]. Some studies show that Asians have a similar keloid incidence to that in Caucasians, but lower than that in Africans [23]. However, in general there is a paucity of studies on seborrheic keratosis and keloid incidence in Asia and among different Asian ethnicities. More research in this area could be beneficial.

Interestingly, psoriasis was significantly more likely to be diagnosed in the males of our cohort than in the females. The disproportionately high percentage of men diagnosed with psoriasis at PHAC compared to women might also be explained by differential health care utilization. Studies show that although psoriasis is slightly more prevalent in women than in men, men often have more severe presentations of psoriasis [24]. Additionally, research has indicated that higher levels of perceived social support are associated with better quality of life in women with psoriasis, a disease often causing significant psychosocial stress [25]. In general, women have wider social support networks and more access to psychosocial resources than do men [26]. The men with psoriasis in our cohort thus may have had more severe symptoms and stress, making them more likely to seek dermatologic care at PHAC.

Notably, the Non-Asian group had the greatest percentage of uninsured patients, whereas the Chinese group had the greatest percentage of patients insured with a plan other than Medi-Cal. These groups similarly had significant differences in their percentages of English-speakers, with the Chinese group being predominantly non-English-speaking and the Non-Asian group being predominantly English-speaking. Although many patients visiting free clinics are low-income or uninsured, it is necessary to consider language barriers as the reason why some patients prefer free clinics over outpatient services covered by their insurance plan. Free clinics are often well equipped to provide translators for several different languages and patients when surveyed have reported high levels of satisfaction with these interpreting services [27]. However, as free clinics largely rely on volunteers who may not be certified medical interpreters, there may be unmet needs in medical translation and more patient satisfaction or quality improvement research may be useful.

In addition to providing in-person translators, PHAC operates during weekends and on a walk-in basis. Patients seen at PHAC often have busy work schedules and may prefer to walk in instead of committing to an appointment at their primary outpatient provider. Additionally, because PHAC is run by medical and undergraduate student volunteers, significantly more time is spent with each patient. Despite student inexperience, patients may feel that their medical concerns are more thoroughly heard, or they may appreciate the fact that they are contributing to their community via student education. These are a few reasons that may explain why many patients with Medi-Cal or other insurance choose PHAC over seemingly more convenient options.

This study was limited by its retrospective design. Clinical diagnosis and treatment data were collected by reviewing patient charts and not confirmed

clinically by the study investigators. Additionally, clinical severity of complaints and diagnoses were not recorded, which may have influenced the treatments given. We also did not have access to patients' household incomes; postal code median household incomes were used instead and may not have been as accurate a measure of patient socioeconomic status.

In conclusion, this retrospective chart review presents data on patients coming to PHAC for skin problems from 2017 to 2020. Patient demographics were recorded and analyzed against diagnoses and treatments. In contrast to a female predominance of eczema in the general population, we found that eczema in our majority-Asian cohort was diagnosed almost as frequently in males as in females, highlighting the need for more ethnicity-centered research on eczema. Eczema was also more frequently diagnosed in the older patients of our cohort (>50 years of age) and in patients from ZIP codes with median household incomes below $90,000. Patients from ZIP codes with the lowest median household incomes (below $50,000) had the highest rate of infectious skin diseases, especially fungal skin infections. Benign skin growths such as keloids and seborrheic keratoses were most commonly diagnosed in Non-Asian and English-speaking patients and psoriasis was more frequently found in males. Topical corticosteroids were the most often prescribed across all income groups and in older patients, whereas antimicrobials were more often prescribed for younger patients. Overall, this study highlights the racial and socioeconomic disparities that may be prevalent among free clinic patients receiving dermatologic care. Free clinics that provide dermatology services may benefit from additional research in this area to optimize clinical outcomes for their underserved patients.

Potential conflicts of interest

The authors declare no conflicts of interest.

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Table 1A. *Diagnoses and **B)** treatments stratified by demographics, presented as n (%). N is the number of responses; % is percentage total of the row, which is given by the N totals (N=) in the 2nd column.*

		Acne	Eczema	Psoriasis	Fungal Infection	Other Infectious	Benign Growth	Seborrheic Dermatitis	Xerosis	Trauma	Pigmentation Disorders	Allergic Reaction	Other
Age	<50 (N=53)	3 (5.7)	8 (15.1)	5 (9.4)	7 (13.2)	4 (7.5)	7 (13.2)	4 (7.5)	1 (1.9)	1 (1.9)	5 (9.4)	6 (11.3)	2 (3.8)
	≥50 (N=60)	0 (0.0)	15 (25.0)	4 (6.7)	4 (6.7)	7 (11.7)	5 (8.3)	2 (3.3)	3 (5.0)	4 (6.7)	3 (5.0)	6 (10.0)	7 (11.7)
Gender	Male (N=52)	2 (3.8)	12 (23.1)	7 (13.5)	4 (7.7)	3 (5.8)	5 (9.6)	3 (5.8)	1 (1.9)	3 (5.8)	2 (3.8)	6 (11.5)	4 (7.7)
	Female (N=61)	1 (1.6)	11 (18.0)	2 (3.3)	7 (11.5)	8 (13.1)	7 (11.5)	3 (4.9)	3 (4.9)	2 (3.3)	6 (9.8)	6 (9.8)	5 (8.2)
Race/ Ethnicity	Non-Asian (N=24)	0 (0.0)	3 (12.5)	2 (8.3)	1 (4.2)	2 (8.3)	7 (29.2)	3 (12.5)	1 (4.2)	1 (4.2)	1 (4.2)	0 (0.0)	3 (12.5)
	Other Asian (N=34)	2 (5.9)	8 (23.5)	4 (11.8)	7 (20.6)	1 (2.9)	2 (5.9)	1 (2.9)	1 (2.9)	0 (0.0)	2 (5.9)	5 (14.7)	1 (2.9)
	Chinese (N=55)	1 (1.8)	12 (21.8)	3 (5.5)	3 (5.5)	8 (14.5)	3 (5.5)	2 (3.6)	2 (3.6)	4 (7.3)	5 (9.1)	7 (12.7)	5 (9.1)
Language	Non-English (N=72)	2 (2.8)	17 (23.6)	5 (6.9)	7 (9.7)	7 (9.7)	4 (5.6)	4 (5.6)	4 (5.6)	3 (4.2)	7 (9.7)	6 (8.3)	6 (8.3)
	English (N=41)	1 (2.4)	6 (14.6)	4 (9.8)	4 (9.8)	4 (9.8)	8 (19.5)	2 (4.9)	0 (0.0)	2 (4.9)	1 (2.4)	6 (14.6)	3 (7.3)
Median Household Income	$0.00-$44,999.99 (N=36)	0 (0.0)	7 (19.4)	4 (11.1)	7 (19.4)	5 (13.9)	4 (11.1)	2 (5.6)	0 (0.0)	1 (2.8)	3 (8.3)	2 (5.6)	1 (2.8)
	$45,000-$89,999.99 (N=55)	2 (3.6)	13 (23.6)	2 (3.6)	2 (3.6)	3 (5.5)	6 (10.9)	4 (7.3)	4 (7.3)	4 (7.3)	2 (3.6)	5 (9.1)	8 (14.6)
	$90,000.00+ (N=20)	1 (5.0)	3 (15.0)	3 (15.0)	2 (10.0)	2 (10.0)	1 (5.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (15.0)	5 (25.0)	0 (0.0)
Distance Traveled (mi)	0-9.99 (N=39)	1 (2.6)	11 (28.2)	3 (7.7)	3 (7.7)	5 (12.8)	4 (10.3)	3 (7.7)	2 (5.1)	2 (5.1)	1 (2.6)	3 (7.7)	1 (2.6)
	10-19.99 (N=52)	1 (1.9)	11 (21.2)	3 (5.8)	5 (9.6)	3 (5.8)	6 (11.5)	3 (5.8)	1 (1.9)	2 (3.9)	5 (9.6)	6 (9.6)	6 (11.5)
	20+ (N=20)	1 (5.0)	1 (5.0)	3 (15.0)	3 (15.0)	2 (10.0)	1 (5.0)	0 (0.0)	1 (5.0)	1 (5.0)	2 (10.0)	3 (15.0)	2 (10.0)
Insurance Status	Uninsured (N=59)	1 (1.7)	11 (18.6)	4 (6.8)	6 (10.2)	6 (10.2)	6 (10.6)	5 (8.5)	3 (5.1)	3 (5.1)	2 (3.4)	6 (10.2)	6 (10.2)
	Insured with Medi-Cal (N=26)	1 (3.9)	5 (19.2)	3 (11.5)	3 (11.5)	2 (7.7)	4 (15.4)	0 (0.0)	1 (3.9)	1 (3.9)	2 (7.7)	2 (7.7)	2 (7.7)
	Insured without Medi-Cal (N=28)	1 (3.6)	7 (25.0)	2 (7.1)	2 (7.1)	3 (10.7)	2 (7.1)	1 (3.6)	0 (0.0)	1 (3.6)	4 (14.3)	4 (14.3)	1 (3.6)

Table 1B. *Treatments stratified by demographics, presented as n (%). N is the number of responses; % is percentage total of the row, which is given by the N totals (N=) in the 2nd column.*

		Topical Steroid	Antimicrobial	Oral Antihistamine	Dry Skin Care	Other Conservative Treatments	Referral	Other
Age	<50 (N=66)	14 (21.2)	18 (27.3)	3 (4.5)	8 (12.1)	10 (15.2)	7 (10.6)	6 (9.1)
	≥50 (N=80)	29 (36.3)	11 (13.8)	7 (8.8)	8 (10.0)	15 (18.8)	4 (5.0)	6 (7.5)
Gender	Male (N=62)	24 (38.7)	8 (12.9)	5 (8.1)	4 (6.5)	11 (17.7)	7 (11.3)	3 (4.8)
	Female (N=84)	19 (22.6)	21 (25.0)	5 (6.0)	12 (14.3)	14 (16.7)	4 (4.8)	9 (10.7)
Race / Ethnicity	Non-Asian (N=28)	6 (21.4)	6 (21.4)	0 (0.0)	3 (10.7)	5 (17.9)	5 (17.9)	3 (10.7)
	Chinese (N=77)	22 (28.6)	10 (13.0)	6 (7.8)	9 (11.7)	17 (22.1)	6 (7.8)	7 (9.1)
	Other Asian (N=41)	15 (36.6)	13 (31.7)	4 (9.8)	4 (9.8)	3 (7.3)	0 (0.0)	2 (4.9)
Language	Non-English (N=94)	30 (31.9)	18 (19.1)	7 (7.4)	11 (11.7)	16 (17.0)	6 (6.4)	6 (6.4)
	English (N=52)	13 (25.0)	11 (21.2)	3 (5.8)	5 (9.6)	9 (17.3)	5 (9.6)	6 (11.5)
Median Household Income	$0.00-$44,999.99 (N=50)	13 (26.0)	13 (26.0)	5 (10.0)	2 (4.0)	10 (20.0)	3 (6.0)	4 (8.0)
	$45,000-$89,999.99 (N=71)	21 (29.6)	11 (15.5)	2 (2.8)	13 (18.3)	11 (15.5)	8 (11.3)	5 (7.0)
	$90,000.00+ (N=23)	9 (39.1)	5 (21.7)	3 (13.0)	1 (4.3)	2 (8.7)	0 (0.0)	3 (13.0)
Distance Traveled (mi)	0-9.99 (N=55)	13 (23.6)	10 (18.2)	3 (5.5)	10 (18.2)	10 (18.2)	7 (12.7)	2 (3.6)
	10-19.99 (N=63)	24 (38.1)	11 (17.5)	4 (6.3)	5 (7.9)	10 (15.9)	4 (6.3)	5 (7.9)
	20+ (N=26)	6 (23.1)	8 (30.8)	3 (11.5)	1 (3.8)	3 (11.5)	0 (0.0)	5 (19.2)
Insurance Status	Uninsured (N=74)	22 (29.7)	18 (24.4)	3 (4.1)	10 (13.5)	13 (17.6)	4 (5.4)	4 (5.4)
	Insured with Medi-Cal (N=35)	8 (22.9)	5 (14.3)	4 (11.4)	5 (14.3)	6 (17.1)	4 (11.4)	3 (8.6)
	Insured without Medi-Cal (N=37)	13 (35.1)	6 (16.2)	3 (8.1)	1 (2.7)	6 (16.2)	3 (8.1)	5 (13.5)