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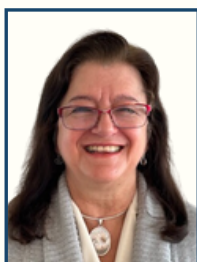
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Dear Colleagues,

It is with great excitement that I welcome you to the Journal's second issue, as we prepare to celebrate the National Hispanic Medical Association's 30th Anniversary and our remarkable achievements.

This pioneering research journal stands as a testament to our unwavering commitment to addressing pressing health issues affecting the Hispanic community. In collaboration with Hispanic state medical societies, residents, medical students, and public and private sector partners, NHMA continues to lead the charge in expanding awareness and advocating for healthcare access and outcomes.

The NHMA Journal, under the guidance of dedicated co-editors Dr. Nellie Correa and Dr. Ana Maria Lopez, along with the invaluable contributions of Dr. Ricardo Correa, Dr. Bert Johannsson, and Dr. Nora Esteban Cruciani, has been a dream-in-the-making for several years. We are proudly launching the second issue in time for NHMA's 30th Anniversary Celebration and Leadership Summit in Washington D.C., on April 12-13, 2024, in Washington D.C. In this second publication we address critical issues such as COVID-19 disparities in the Puerto Rican population living with cancer, diabetic retinopathy in underserved communities, and climate justice.

This journal serves as a platform for the most pressing health concerns facing the Hispanic community today, filling a crucial gap that has regrettably been overlooked by many mainstream journals. We are dedicated to upholding the highest standards in the selection and review process, and we are confident that the JNHMA will make substantial progress in addressing the challenges that affect Latino communities.

I would like to thank all those who have been instrumental in making our organization and the Journal significant forces for change in the healthcare landscape. Together, let us continue to advance the health and well-being of our communities.

To learn more, purchase tickets, and explore other ways to support our 30th Anniversary Celebration, go to www.nhmamd.org/30th-anniversary-summit.

Thank you for your support, and here's to the next 30 years of groundbreaking achievements!

Warm regards,

Dr. Elena Rios, MD, MSPH, MACP
President and CEO
National Hispanic Medical Association

On Screening, Early Detection, and Saving Lives

By JNHMA Editorial Board

This second issue of the Journal of the National Hispanic Medical Association includes several articles important to our community. The manuscripts range from language access to mental health, diabetes, colon cancer, mentorship, and climate change.

As an oncologist, my attention was drawn to the paper on The Impact of the COVID-19 Pandemic on the Presentation of Colorectal Cancer in the Puerto Rican Population. From an oncology perspective, a diagnosis of colon cancer is a failure of screening efforts. Screening identifies disease early before symptoms are apparent. The carcinogenic process for colorectal cancer has been well-delineated and is estimated to be in the range of ten to fifteen years. Colorectal cancer screening with a colonoscopy provides an opportunity for early detection of a malignancy and for treatment of a pre-malignant lesion. If a colonoscopy is not feasible, stool-based tests are also available.

The recently updated recommendations by the U. S. Preventive Services Task Force (UAPSTF) take into consideration cancer risk across the lifespan. As younger people are being diagnosed, the age for screening onset has dropped to 45 years of age for persons at average risk. Persons with a family history or a genetic mutation should speak with their doctor regarding when to start screening. As people are living longer and living well longer, screening can continue to age 85 based on clinical judgment and shared decision making. Individual factors that can be taken into consideration include the person's overall health, prior screening results, and life expectancy.

According to the Centers for Disease Control and Prevention (CDC), in 2020, just over two-thirds of eligible adults were up to date on colorectal screening. According to the CDC, a 10% increase in screening, would result in a 20% drop in colorectal cancer diagnoses, a 30% drop in deaths, and a drop in health care costs.

Despite these benefits, less than half of Latinos/Hispanics eligible for colorectal screening have been screened with only a third of diagnoses being in an early stage. With the shift to younger age of diagnosis, Latinos/Hispanics experienced the greatest increase in colorectal cancer incidence in those 20 to 29 years of age (Montminy). Co-morbidities such as diabetes and being overweight appear to increase risk along with hereditary and lifestyle factors (sedentary lifestyle, limited fruits and vegetables, processed meats, and increased psychosocial stress).

The article by Martínez-Valcárcel reminds us that barriers to screening, such as the COVID-19 pandemic, delay diagnoses and result in advanced disease. We work with our communities to increase colorectal cancer screening and other cancer screenings because screening and vaccinations save lives.

References

1. CDC, Health and Economic Benefits of Colorectal Cancer Interventions. December 21, 2022. (Accessed November 10, 2023). <https://www.cdc.gov/chronicdisease/programs-impact/pop/colorectal-cancer.htm>
2. Montminy EM, Zhou M, Maniscalco L, Heda R, Kim MK, Patel SG, Wu XC, Itzkowitz SH, Karlitz JJ. Shifts in the Proportion of Distant Stage Early-Onset Colorectal Adenocarcinoma in the United States. *Cancer Epidemiol Biomarkers Prev.* 2022 Feb;31(2):334-341. PubMed PMID: 35082122

The Impact of the COVID-19 Pandemic on the Presentation of Colorectal Cancer in the Puerto Rican Population

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ABSTRACT

Introduction: Colorectal Cancer (CRC) is the third most common cancer and the second malignancy with the highest mortality rate in the United States. Regular screenings with colonoscopies are useful studies used to detect and diagnose CRC. However, amid the Coronavirus 19 pandemic, regular screening was postponed resulting in delayed diagnosis and treatment for patients with CRC. **Objective:** The aim of this retrospective study was to analyze and compare the impact of the pre-COVID and COVID periods in the presentation of colorectal cancer. **Methods:** This retrospective study included 85 patients, whose information was obtained from medical records, 32 in the pre-COVID group and 53 in COVID group. **Results:** When comparing colonoscopies, more than half of the patients presenting in the COVID period presented with no colonoscopies as opposed to the pre-COVID patients where most presented with recent colonoscopies. Pathology reports showed a double and a triple increase of advanced stages of CRC, III and IV respectively, the COVID period as compared to pre-COVID cohort. **Discussion:** Moreover, the number of patients presenting with metastasis in the pandemic period showed a 'borderline' significance (OR 0.105, 95% CI 0.01-1.1, $p=0.053$). There was no significant difference in patient demographics. **Conclusion:** A future study should include a larger population with data from more clinics in order to validate or refute the actual significance of such findings.

Keywords: colorectal cancer, COVID-19, pandemic, colonoscopies, metastasis, retrospective study

1. Introduction

The COVID-19 pandemic has been a global phenomenon affecting many aspects of our lives, including the medical services we sought and the care we received. As the Pandemic progressed, safety protocols were implemented and routine health maintenance visits were canceled or postponed. This, along with the fear of being exposed and contracting the virus, lead patients to not seek the required medical care in a timely manner. Particularly, cancer patients were some of the most affected by the pandemic. These patients would come to suffer the long-term effects of postponing scheduled screenings for cancer.

Colorectal cancer is the third most common type of cancer and one of the few that has routinary screening tests available [1]. It was reported that during 2020, the average report of cancer diagnoses fell significantly compared to the average number in 2018 and 2019; colorectal cancer (CRC) diagnosis had one of the highest decreases [2]. The patients who went undiagnosed or that received a diagnosis of advanced staging went to account for the vast number of avoidable deaths due to colorectal cancer. In turn, the impediment of screening for CRC also significantly increased the number of patients that presented with metastases, those who underwent neoadjuvant therapies and palliative surgeries, and those with emergency presentations [3].

In this comparative study, we aim to analyze the impact of the COVID-19 pandemic in the treatment, diagnosis and prognosis of colorectal cancer in two-time cohorts, pre-Covid and Covid, to see whether there was a decrease in the amount of preventative screening available, such as colonoscopies, that lead to cancer upstaging and limited treatment outcomes.

2. Methodology

A retrospective medical record search was conducted on all patients from January 2019 to May 2021 that were evaluated at Saint Luke's Memorial Hospital and Bolaños Surgical Services in Puerto Rico with the diagnosis of colorectal cancer. All patients in this study were admitted by the general surgery department and underwent surgical procedures. The database applications from which the medical records were retrieved were Meditech and NeoMed. We sought to obtain a large enough study population to divide it into two periods, a pre-COVID cohort and a COVID cohort. March 2020 was selected as the division between both time periods since it was the time when the Puerto Rican government declared COVID-19 as a national emergency and implemented an island wide lockdown.

The search criteria for patients were based on the following ICD 10 Codes: K63.5 (polyp of colon), C-18 (malignant neoplasm of colon), C-19 (malignant neoplasm of rectosigmoid junction) and C-20 (malignant neoplasm of rectum). Here, information such as patient general information, comorbidities, colonoscopies, surgery performed, surgical approach, COVID test results, pathology TNM staging were analyzed and recorded on the data application RedCap. Patient diagnosis was categorized based on the severity at the moment of presentation.

Patients were included in this study if they were admitted in the established time frame of January 2019 to May 2021 and had a diagnosis of colorectal cancer. The selected exclusion criteria for this study were: (1) having a past medical history of colorectal malignancies, (2) having a family history of colorectal cancer, and (3) being under the age of 21.

2.1 Data Extraction and Outcomes Evaluated and Definitions

The data extracted from MediTech and NeoMed was entered into standardized Microsoft Excel spreadsheets for data tabulation. Data of primary importance included the time interval from which the data was collected for each of the cohorts, the total number of patients, emergency or outpatient department presentation, prior colonoscopies, surgical intervention and the pathology reports for the cancerous tumor including the tumor, node, and metastasis (TNM Classification System).

Secondary data included patient demographics, comorbidities, smoking and alcohol history, vital signs, history of present illness, COVID-19 test results, hospital and intensive care unit length of stay, complications, mortality rate and tumor location.

2.2 Statistical Analysis

The data tabulated in Microsoft Excel was exported into RedCap for further analysis. A cross tabulation was made between pathological stagings (Stage 1, 2, 3, 4) and the period of admission (pre-COVID or COVID) for each group. The number of patients for each pathological staging and the percent of patients with diagnosis of CRC in a particular staging during a particular time period was recorded and totalized.

A chi square test was performed to compare the rate of patients with metastasis in each period of admission. Given our study population and the variables in place, the p value and Odd Ratios (OR) was calculated. All p-values less than 0.05 were considered statistically significant.

3. Results

A total of 85 patients with a confirmed diagnosis of colorectal cancer presented to Saint Luke's Memorial Hospital and Bolaños Surgical Services during the three-year study period were included in our investigation. 53 patients were categorized under the pre-COVID, which included patients admitted from January 2019 to February 2020. In turn, 32 patients were placed under the COVID group, which included patients admitted from March 2020 to May 2021. Most of the selected patients had all the available data required for our study, with only a few exceptions. 53 out of the 85 total patients did not have a known metastasis category in their pathology reports. Also, some patients did not have general information such as BMI, comorbidities, substance use status, etcetera, in their records.

3.1 Patient General Information

As for gender distribution, the pre-COVID group showed a predominance of male patients to female patients, 59% to 41%, respectively. As for the COVID group, there was no significant male:female gender distribution, 51% to 49%. With

regards to patient age, the average age for the pre-COVID group was 69, while in the COVID group it was 62. In terms of Body Mass Index, most patients in both cohorts were classified in the overweight category. Since all patients in this study underwent surgical procedures, their ASA score was calculated upon admission. During the pre-COVID group, most patients presented with an ASA score of either 1 or 2, accounting for 51.7% of the patients. As for the COVID group, the most frequent score was ASA 3 and 4, accounting for 56.6% of patients.

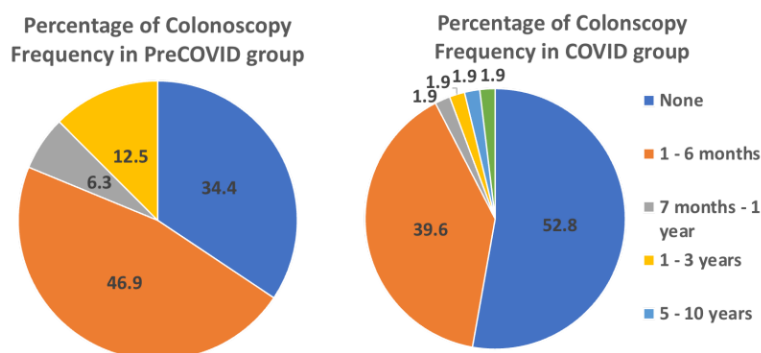
3.2 Patient Comorbidities

The most common comorbidities in both cohorts were hypertension, diabetes, hypothyroidism, obesity and coronary artery disease. These comorbidities were seen in varying frequency and combination among patients. Hypertension was seen in 69% of the patients in the pre-COVID group, while it was seen in 68% of the patients in the COVID group, while diabetes was seen in 31% of the pre-COVID patients and 25% of the COVID patients. Other less common comorbidities seen, accounting for less than 5% of the presentations in both cohorts, were COPD, hyperlipidemia, asthma, epilepsy and chronic kidney disease. Related comorbidities were seen in 87% of the total patient population. Regarding substance use, the majority of the patients from both cohorts, over 80%, reported that they did not smoke nor consume alcohol.

3.3 Patient Presentation

Furthermore, patient presentation in the study was divided into patients arriving through the Emergency Department or as outpatient elective cases. In the pre-COVID, 59% presented electively as outpatient scheduled cases (OPD). Similarly, in the COVID group, most patients 53% also arrived through the OPD. Upon arrival, patients' vital signs were taken along with COVID-19 test. For almost all of the patients in both cohorts, above 96% for each, presented normotensive and with a negative COVID-19 test. In regards to patient profiles, the history of present illness and history of colonoscopies were taken. Patient presentation was further categorized into five history of present illness (HPI) presentation categories: 1) Bleeding, 2) Elective, 3) Obstruction, 4) Pain or 5) Perforation. In the pre-COVID group, the most common HPI presentation was for elective surgeries, accounting for 53%. In the COVID group, only 36.6% of the patients presented for elective surgeries. The remaining 63.4% of the patients presented with the remaining acute clinical presentations requiring surgical intervention, bowel obstructions being the most common at 26.9%.

Figure 1: Percentage of Colonoscopy in the Pre-COVID group (left) and the COVID group (right)



3.4 Colonoscopies

The colonoscopy reviews in this study were based on the 2020 American Cancer Society Guidelines for Colorectal Cancer Screening. These guidelines establish that people at average risk of colorectal cancer should start regular screening at age 45 [1]. After that, colonoscopy screenings should take place regularly every 10 years, for people at average risk. In the study, colonoscopies were categorized into how recently it had been performed: 1) none, 2) 1 month-6 months prior, 3) 7 months- 1 yr prior, 4) 1yr - 4yrs prior, or 5) 5yrs -10yrs prior. In the pre-COVID group, 53.2% of patients had a colonoscopy within the last year before surgical intervention and 34.4% of patients had no colonoscopies. In the COVID group, the percentage of colonoscopies within the last year decreased to 41.5% while the percentage of no colonoscopies increased to 52.8% (Figure 1).

3.5 Surgical Procedures, Tumor Locations and Complications

The surgical procedures that the patients in both cohorts underwent showed that the most common surgery was a hemicolectomy with primary anastomosis, which accounted for 46.1% of surgeries in the pre-COVID group while it accounted for 39.6% of surgeries in the COVID group. The second most common procedure was a low anterior resection, 34.4% of cases in the pre-COVID group and 26.4% of cases in the COVID group. All tumors in the pre-COVID group were operable. In the COVID group, 4 out of the 53 patients had procedures in which the tumors were determined to be inoperable. In terms of surgical approach in the pre-COVID cohort, patients underwent exploratory laparotomies in 54.8% of the cases and laparoscopies in 45.2% of the remaining cases. In the during COVID cohort, most cases were laparoscopies 59.2% and the remaining 40.8% were exploratory laparotomies. The anatomical distribution of the tumor location was similar in both time cohorts. Results showed that the sigmoid colon was involved in 37.5% of the cases in the pre-COVID group and 41.5% of the cases in the COVID group, while the ascending colon was involved in 31.3% of cases in the pre-COVID group and 39.6% of cases in the COVID group. The cecum was the least involved anatomical location for tumors in both pre-COVID and COVID groups, 1 and 3 cases, respectively. As for surgical complications, the most common complication presented by the study population after surgery was acute kidney injury, representing 18.8% of patients in the pre-COVID group and 9.4% of patients in the COVID group.

3.6 Pathologic Staging

Tumor stagings were categorized utilizing the American Joint Committee on Cancer TNM system. It is important to note that some reports had incomplete TNM values, but with the values they did have, staging could be determined. Pathology reports with the TNM classification were further categorized based on TNM combinations into their respective CRC stages. Colorectal Cancer staging includes Stages 1 through 4. Table 1 shows the pathologic staging showing the cross tabulation between pathology and period of admission. Within each period of admission, the most common malignancy in the pre-COVID time was stage 2 with 21.9% of cases and, during the COVID time, it was stage 3 with 30.8% of the cases. In more advanced stagings of CRC, stage 3 and 4, pathology reports showed an overall increase from one time period to another. Within stage 3 malignancy cases, only 27.3% were found in the pre-COVID group, whereas 72.7% were found in the COVID group. Similarly, within stage 4 malignancy cases, only 30.8% were found in the pre-COVID group, while 69.2% were found in the COVID group.

Table 1: Pathology * Period of Admission Crosstabulation

Table 1: Pathology/Period of Admission Crosstabulation

		Period of admission			
Pathology		Pre-COVID	During COVID	Total	
	Stage 1	Count	4	10	14
		% within Pathology	28.6%	71.4%	100.0%
		% within Period of Admission	12.5%	19.2%	16.7%
		% of Total	4.8%	11.9%	16.7%
	Stage 2	Count	7	9	16
		% within Pathology	43.8%	56.3%	100.0%
		% within Period of Admission	21.9%	17.3	19.0%
		% of Total	8.3%	10.7%	19.0%
	Stage 3	Count	6	16	22
		% within Pathology	27.3%	72.7%	100.0%
		% within Period of Admission	18.8%	30.8%	26.2%
		% of Total	7.1%	19.0%	26.2%
	Stage 4	Count	4	9	13
		% within Pathology	30.8%	69.2%	100.0%
		% within Period of Admission	12.5%	17.3%	15.5%
		% of Total	4.8%	10.7%	5.5%
	Cannot be determined	Count	11	8	19
		% within Pathology	57.9%	42.1%	100%
		% within Period of Admission	34.4%	15.4%	22.6%
% of Total		13.1%	9.5%	22.6%	
Total	Count	32	52	84	
	% within Pathology	38.1%	61.9%	100%	
	% within Period of Admission	100%	100%	100%	
	% of Total	38.1%	61.9%	100%	

3.7 Additional Analysis

A chi square analysis, shown in table 2, compares the period of admission, with outcomes being pre-COVID and during COVID, and metastasis, with outcomes being M0 and M1. It is important to note, as previously mentioned, only 32 out of the 85 patients had known metastasis categories, either M0 or M1, in their reports. The remaining 53 patients were excluded from this analysis due to incomplete TNM staging information. Out of the 32 patients included in this analysis, 20 presented with an M0 category while the remaining 12 patients presented with M1; cancer spread to other parts of the body. Particularly, in the metastasis category (M1), 4 out of the total 12 patients presented from the pre-COVID group; while 8 out of the total 12 patients presented from the COVID group. Utilizing this information of metastasis by period of admission, a p-value of 0.053 was obtained along with an odd ratio of 0.105 (Table 2).

Table 2: Metastasis by Period of Admission in the two time periods

Period of Admission	Metastasis			
	M0		M1	
	Frequency	Percent	Frequency	Percent
Pre-COVID	1	5	4	33.3
During COVID	19	95	8	66.7
Total	20	100	12	100
Variable	n		p-value	Odd Ratio
Metastasis by period of admission	32		0.053	0.105

3.8 Hospital and Intensive Care Unit Length of Stay

The length of stay of patients after their admission to their surgical procedures was taken and divided into their time in the ICU and their total hospital time. The ICU length of stay was an average of 2 days for the pre-COVID group (range of 0-33 days). As for the COVID group, the average length of stay was 1 day (range of the 0-6 days). As for the patient's hospital length of stay for the pre-COVID group, the average stay was of 11 days (range 3-50 days). As for the COVID group, the average stay was 9 days (range 2-30 days). In the end, the patients in both cohorts had a survival rate of 88% in the pre-COVID and 91% COVID. However, some patients expired during the index admission, accounting for a mortality rate of 12% and 9% in the pre-COVID and COVID cohorts, respectively.

4. Discussion

The focus of the COVID-19 pandemic has been COVID patients, whilst non-COVID patients, such as cancer patients, have not had the health services they require in a timely manner [4]. Colorectal cancer, a type of cancer that has screening tests available, had some of the most affected patients. Lack of routine screenings has caused long term effects for colorectal cancer patients in particular because this disease has a progression that is time-dependent [5,6].

In the analysis, patient demographics did not vary significantly with the average age of patients in both pre-COVID and COVID groups averaging above age 64. Gender distributions did not show a significant tendency towards a gender, although male patients did predominate in each of the cohorts. In relation to BMI, most patients were under the category of overweight and obese. As is known, obesity is a known risk factor for CRC and the patients in this study represented this factor in both period groups [7]. In terms of the American Society of Anesthesiology Physical Status Classification System, patients in the COVID group presented with greater ASA scores, meaning more comorbid conditions as compared to the healthy or mildly compromised patients in the pre-COVID group. With this, systemic comorbidities included hypertension and diabetes. In particular, diabetes type 2 has shown to have a relation to CRC as a predisposing risk factor [8].

As per our hypothesis, patients presenting in the COVID group would have acute presentations since they could not get the routine screenings to diagnose the polyps that would later turn into CRC [5]. When comparing both time periods, patients in the pre-COVID group presented mostly for elective surgeries. This shows that in a time prior to COVID, regular screening and scheduled interventions potentially was leading to less severe presentations, lower staging of CRC and increased survival outcomes. Meanwhile, most patients in the COVID group presented with acute symptoms such as

GI bleeding and obstruction. Thus, there was an overall decrease in elective surgeries and increase in acute presentation in the COVID period when compared to the pre-COVID period. Upon patient admission, history of colonoscopies was important information to gather. When compared to the pre-COVID group, the COVID group showed a decrease in the percentage of colonoscopies done within one year of surgical intervention (53 to 40 percent) and an increase in the percentage of patients with no previous colonoscopies (34 to 53 percent). Patients were not getting their routine colonoscopies during COVID due to the limitations and security measures established at hospitals. Above this, the fear of exposure to COVID-19 was also a factor that played into postponing colonoscopy procedures [9].

In respect to surgical approaches, all patients in the pre-COVID group underwent their respective surgery. The most common surgery being a hemicolectomy with primary anastomosis. However, not all surgeries in the COVID group were operable due to advanced stages upon diagnosis. This is sustained because if the patients could not get their adequate screening on time, the tumor size would keep on progressing. It is important to note that CRC has a long lead time, but detecting a tumor before advance staging is critical to improve the prognosis of patients. In the same means of safety precautions, during COVID, the most common surgical approach was laparoscopic. During COVID, minimally invasive procedures were preferred to reduce the risk of aerosolized transmission [10]. In terms of tumor location, the patients in this study followed the trend having tumors located in the rectosigmoid colon, as previous data has highlighted (11).

Moreover, the pathology reports demonstrated that patients presenting with advance staging, that being stage III and IV, showed a percentual duplication and triplication, respectively, in the COVID group, as compared to those of the pre-COVID group. Cancer upstaging was clearly seen with results. In the pre-COVID cohort, the most common malignancy was Stage 2, whereas in the COVID group it was Stage 3. Within Stage 4 malignancies, most cases were found in the COVID group as well. The analysis of metastasis and admission period showed a borderline significance ($p=0.053$, 95% CI 0.01-1.1) and an Odds Ratio of 0.105. That is, patients in this study had a 0.105-fold lower chance of developing metastasis in the admission period prior to COVID than those who were admitted during the COVID period. Lastly, it was seen that patients in the COVID period had a shorter ICU and hospital length of stay. With the health restrictions and distancing taking place during the lockdown, hospitals wanted to further limit the spread of COVID in their facilities by keeping postoperative patients hospitalized for the least amount of time possible. The contraction of COVID in a postoperative cancer patient would prove detrimental to the recovery efforts after the surgical procedures [12].

In terms of impact, this study highlights the healthcare system's need for effective emergency preparation in the face of events such as pandemics. This comes to show that the healthcare system is not structured to prioritize preventative medicine; rather, it predominantly focuses on the management of acute and chronic disease presentations. During COVID-19, patients screening was affected as fear of exposure to virus and regular medical appointments postponed. However, proper preventative measures in the face of these limitations could include the use of telemedicine and screening appointment reminders via phone call or text message could prove to be valuable tools in bridging the gap towards continuous patient-doctor interactions. Another potential initiative might involve sending colorectal cancer symptom surveys to at-risk patients to better prioritize their urgent need for appointments and screenings. Furthermore, although our study's main focus was to analyze the Coronavirus-19's effect on CRC by comparing two-time cohorts in terms of disease diagnosis, treatment and prognosis, this study also highlights the need to study the long-term effects of delaying a patient's routine procedure in other conditions such as breast and prostate cancer.

Overall, the findings in this study were of borderline significance due to some limiting factors. Some medical records lacked information on core study variables such as BMI, comorbidities, substance use, colonoscopy screenings, etc. Also, some pathology reports also lacked the complete TNM classification, which significantly decreased our initial study population to only patients with known M0 or M1. This is a very important factor that affected the significance of our results. Lastly, being a retrospective study, the study population was limited to 85 patients, a sample which does not allow us to generalize our conclusion to an entire population. As for the continuation of this study, the inclusion of other hospital and general surgery clinics in our database would allow for a more comprehensive picture and would validate or refute the significance of the findings of this study.

5. Conclusion

Colorectal Cancer patients were just some of the many affected by the Coronavirus 19 pandemic. Delayed colonoscopies resulted in a late diagnosis, when the cancer had advanced further, leading to more aggressive tumor development and thus more complex prognosis for patients. When comparing the two-time cohorts, pre-COVID and COVID, it was demonstrated that patients in the pre-COVID group had better odds as to having timely colonoscopies, early CRC stages and thus a better prognosis. Nonetheless, there was no significant difference in the pathologic diagnosis between time periods. As well as no significant difference in patient demographics and presentation of CRC in both groups. For future continuation of this study, a larger population sample should be attained by compiling patient medical records from this time period and scenario from other local clinics and hospitals.

Author's note: Alexandra Schoene Ruiz, MD and Maralexa Martínez-Valcárcel contributed equally to this work.

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References

1. American Cancer Society. Colorectal Cancer Facts & Figures 2020-2022. Atlanta, Ga: American Cancer Society; 2020.
2. De Vincentiis, L., Carr, R. A., Mariani, M. P., & Ferrara, G. (2021). Cancer diagnostic rates during the 2020 'lockdown', due to COVID-19 pandemic, compared with the 2018–2019: an audit study from cellular pathology. *Journal of Clinical Pathology*, 74(3), 187-189.
3. Pararas, N., Pikouli, A., Papaconstantinou, D., Bagias, G., Nastos, C., Pikoulis, A., & Pikoulis, E. (2022). Colorectal Surgery in the COVID-19 Era: A Systematic Review and Meta-Analysis. *Cancers*, 14(5), 1229.
4. Clerk AM. Beware of Neglect of Non-COVID Patients in COVID Era. *Indian J Crit Care Med*. 2021;25(8):837-838. doi:10.5005/jp-journals-10071-23940
5. Harber I, Zeidan D, Aslam MN. Colorectal Cancer Screening: Impact of COVID-19 Pandemic and Possible Consequences. *Life (Basel)*. 2021;11(12):1297. Published 2021 Nov 26. doi:10.3390/life11121297
6. Mazidimoradi A, Tiznobaik A, Salehiniya H. Impact of the COVID-19 Pandemic on Colorectal Cancer Screening: a Systematic Review. *J Gastrointest Cancer*. 2022;53(3):730-744. doi:10.1007/s12029-021-00679-x
7. Mandic M, Safizadeh F, Niedermaier T, Hoffmeister M, Brenner H. Association of Overweight, Obesity, and Recent Weight Loss with Colorectal Cancer Risk. *JAMA Netw Open*. 2023;6(4):e239556. doi:10.1001/jamanetworkopen.2023.9556
8. Yu GH, Li SF, Wei R, Jiang Z. Diabetes and Colorectal Cancer Risk: Clinical and Therapeutic Implications. *J Diabetes Res*. 2022; 2022: 1747326. Published 2022 Mar 7. doi:10.1155/2022/1747326
9. Timmouth, J., Dong, S., Stogios, C., Rabeneck, L., Rey, M., Dubé, C., ... & Wallace, J. (2021). Estimating the backlog of colonoscopy due to coronavirus disease 2019 and comparing strategies to recover in Ontario, Canada. *Gastroenterology*, 160(4), 1400-1402.
10. Tommaselli GA, Grange P, Ricketts CD, Clymer JW, Fryrear RS 2nd. Intraoperative Measures to Reduce the Risk of COVID-19 Transmission During Minimally Invasive Procedures: A Systematic Review and Critical Appraisal of Societies' Recommendations. *Surg Laparosc Endosc Percutan Tech*. 2021;31(6):765-777. Published 2021 Jul 28. doi:10.1097/SLE.0000000000000972
11. Patil J, Mohamed Y, AlMarzooq R (May 04, 2023) A Retrospective Study of the Prognostic Patterns in Colorectal Cancer Patients. *Cureus* 15(5): e38522. doi:10.7759/cureus.38522
12. Spinelli A, Carvello M, Carrano FM, et al. Reduced duration of stay after elective colorectal surgery during the peak phase of COVID-19 pandemic: A positive effect of infection risk awareness? *Surgery*. 2021;170(2):558-562. doi:10.1016/j.surg.2020.12.017

Estimating the Impact of Limited English Language Proficiency on Mental Health Services for Spanish Speakers in the United States

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1. Introduction

The United States Latine/x population is now over 62 million and comprises nearly 19% of the population [1]. Over 42 million speak Spanish and comprise the second-largest language group in the United States [2]. As the largest non-English language group, Spanish speakers pose the greatest need for language-concordant mental health services. Providing language-concordant and culturally responsive services is critical to ensure meaningful access and improve treatment outcomes [3].

The current authors use the pan-ethnic terms Latine or Latinx as encompassing the terms Hispanic (derived from Spain plus the entire Spanish colonized empire), Latino/a (gendered, for those with ties to Latin America specifically), and Chicano/a (a racist slur reclaimed as a symbol of pride for Mexican Americans specifically) [4]. Latine/x includes widely varied acculturation, language, and immigration statuses, all of which impact an individual's ability and willingness to enter the United States mental health system and seek services [5,6]. Indigenous individuals from Latin America likely do not align with this term, and may or may not speak Spanish, however, are likely placed in the above monolithic categories in the databases referenced herein.

1.1 Latine/x Mental Health

While Latine/x in the United States as a group have shown to be remarkably resilient and a major contributor to the well-being of society [7,8,9], they also have a range of specific needs, not unlike other segments of the population. According to Villatoro et al. [10], the National Latino and Asian American Study shows that “approximately 60% of Latinos meet the diagnostic criteria for any lifetime mood, anxiety, or substance use disorder... comparable with patterns observed among non-Latino Whites” (p. 354). Nonetheless, the authors found differences in the persistence of disorders, where “disadvantaged groups had higher risk” for further sustained persistence (p. 327).

The most vastly underserved Latine/x population comprises the adults, children, and families that arrive at the United States Southern border each year. The Border Patrol reports that between 155,000 and 241,000 migrants per month were encountered at the border in 2022 [11]. In addition, in 2020, over 26,000 unaccompanied minors arrived [12]. Greenberg estimates this is in addition to the 6,000 to 8,000 unaccompanied children arriving annually over the last decade. This has resulted in hundreds of thousands entering the United States with trauma histories originating from their home countries, migration journeys, separation and detention experiences, and ongoing stateside ethno-racial xenophobia and discrimination; this trauma often results in acute and then post-traumatic stress disorders (PTSD) [13-16]. Not all would seek or require services; however, those who desire help face multiple challenges in accessing practitioners who can serve them effectively due to linguistic and cultural barriers [17-20].

Recent immigrants report adverse childhood experiences, sexual assaults, chronic mental and medical illness, postpartum depression, domestic violence, and substance abuse [21,22]. They often report significant trauma histories from war, drug cartel violence, chronic poverty, discrimination, and immigration enforcement [23-29]. Research into adverse childhood experiences and racial trauma highlights that Latine/x immigrant populations are at increased risk for mental health and substance use difficulties, with more barriers to healthcare access than their non-Latine/x white American counterparts [21,30,31,32].

Clinical and federal guidelines for the ethical treatment of mental health clients require agencies to ensure their clients understand the services they are receiving [33,34]. Valid informed consent throughout treatment means that clinical sessions, linkage to collateral services, advocacy, and all related documentation are accessible to the clients served under the ethic of autonomy [35]. The rising rates of politically and environmentally displaced migrants will continue exacerbating this need, a growing humanitarian mental health crisis that healthcare educators and providers must address [36]. For trauma processing to be effective, it must occur in one's preferred language [37]. For native Spanish-speaking clients, this means receiving mental health services in clinically fluent Spanish, which is becoming markedly harder to access in the states with the most growth in Spanish-speaking residents [32].

Chronic stress and trauma interrupt language processing, which is further complicated when one cannot communicate their service needs in their preferred language [37,38]. In addition, clinical miscommunication leads to attrition, premature termination, and increased danger for at-risk clients [32]. These clinical concerns, coupled with recent increases in immigration and educational barriers, are key reasons why more Spanish-language services are needed to improve access and effectiveness in mental healthcare.

Studies parsing out language acquisition and use suggest that attaining and maintaining bilingualism increases access to multiple support systems. Bilingualism seems to support lower rates of depression among Latine/x who have achieved English language fluency while maintaining Spanish fluency [39,40]. Spanish-English bilingualism increases as first and second-generation Latine/x become acculturated. By the third and fourth generations, it appears English has become the dominant language [41]. Achieving English language proficiency takes years. Until proficiency is achieved, there is a need for Spanish language services. Even after English proficiency is achieved, emotional processing for bilinguals is complex [42]; therapeutic benefits are more likely to be obtained when the practitioner can facilitate in both languages.

Limited English language proficiency by Spanish speakers in the United States presents a challenge to those seeking effective mental health services and to health care providers. This study sought to estimate how many Spanish speakers with mental health or substance use disorders in the United States are currently impacted by limited English proficiency. This was also done to get a better understanding of the current shortfall in Spanish language clinicians needed to meet current and future needs.

2. Methods

The authors attempted to answer these questions by examining the most recent United States Census data [1,2,43-48] to understand the language needs of Spanish speakers in the United States. We then combined the United States Census population and language data sets with the Substance Abuse and Mental Health Services Administration survey results on Latine/x mental health [49].

The 2020 United States Census Bureau Decennial survey of the United States population provided the basic demographics regarding the Latine/x population [1]. That questionnaire was distributed in multiple languages, including both Spanish and English. One of the questions contained was: "Is this person of Hispanic, Latino, or Spanish origin?" [43]. Response choices were: "No, not of Hispanic, Latino, or Spanish origin; Yes, Mexican, Mexican Am., Chicano; Yes, Puerto Rican; Yes, Cuban; Yes, another Hispanic, Latino, or Spanish origin, for example, Salvadoran, Dominican, Colombian, Guatemalan, Spaniard, Ecuadorian, etc."

It is important to note that there was a significant change in 2020. The question regarding Hispanic, Latino, and Spanish origins was updated and differentiated from race. Therefore, commencing in 2020, an individual could categorize themselves as a member of a race and Hispanic such as Black-Hispanic, White-Hispanic, American Indian-Hispanic, Alaska Native-Hispanic, and Asian and Pacific Islander-Hispanic.

The second data source is the United States Census Bureau American Community Survey (ACS) program [2,44]. The ACS survey sampled approximately 3.5 million mailing addresses to collect household-level data to produce annual social, economic, and housing demographics, as well as estimates of languages spoken and English language proficiency. That survey asked three language-related questions: (1) Does this person speak a language other than English at home? (2) What is this language? (3) How well does this person speak English?

The third data source is the Substance Abuse and Mental Health Services Administration (SAMHSA) results from the 2019 National Survey on Drug Use and Health: Hispanics [49]. This annual survey solicited responses regarding mental health, substance use, and treatment. The survey sampled 67,500 persons from the 50 states and the District of Columbia.

The authors first analyzed the most recent 2020 United States Census Decennial data to determine the percentage and number of individuals who may be categorized as Latine/x [1]. The United States Census Bureau estimates that the United States population is approaching 332 million, with nearly 19% identifying as Hispanic or Latine/x. Approximately 67% are United States-born; the remaining 33% are immigrants.

Next, the United States Census American Community Survey (ACS) was studied to address the issue of English language proficiency [2,44-48]. The ACS survey statistics estimate that nearly 22% (~68 million) of individuals in the United States aged five years and older speak a language other than English at home [44]. Spanish speakers make up over 41 million of that number. Spanish-speaking individuals currently comprise 16 million households across the country [44]. Two key statistics derived from the United States Census ACS data are (1) 66% of those categorized as Latine/x speak Spanish at home, and (2) at least 26% of those categorized as Latine/x speak English less than very well.

The United States Census Bureau ultimately dichotomized individuals as either speaking English very well or less than very well. Given the referenced surveys chose different language to describe categories, the current authors treat the ACS survey category of “less than fluent” in English as equivalent to the Federal language term “limited English proficient” [51]. The current authors went on to assume that the greatest need for Spanish language and culturally literate mental health services would likely come from the over 16 million Spanish speakers who self-identify as less than fluent in English.

Table 1 summarizes the most current information on language proficiency within the Latine/x population by age.

Table 1: Latine/x Spanish Speakers and English Proficiency in the United States

Age	United States Population in 2021	Latine/x Population	Latine/x as % of US Population	# Speaking Spanish at Home	# Limited English Proficiency
<i>Under 5</i>	18,661,245	4,851,979	26.00%	--	--
<i>5 to 17</i>	54,814,033	14,008,384	25.56%	8,118,810	1,727,839
<i>18 to 64</i>	202,526,453	38,622,762	19.07%	28,8915,508	12,103,379
<i>65 and</i>	55,892,014	5,045,939	9.03%	4,244,623	2,468,651
<i>Total</i>	331,893,745	62,529,064	18.84%	41,254,941	16,299,869

3. Results

The authors combined the United States Census Decennial and ACS data regarding Spanish speakers with the SAMHSA survey data to estimate the mental health service needs of Spanish speakers and those with limited English proficiency. The estimated interaction of English language fluency and mental health issues among the Latine/x population is summarized in Table 2. Based upon SAMHSA’s National Survey on Drug Use and Health [49], it is estimated that 8.9 million Latine/x are living with substance use or mental health disorders. That number is further broken down into those with a mental disorder (7.4 million), a substance use disorder (2.9 million), and co-occurring substance use and mental health disorders (1.4 million). It is estimated that nearly 5.9 million Latine/x living with mental health or substance abuse issues speak Spanish at home and would benefit from Spanish language services. The greatest need for Spanish language services is likely among the 2.3 million Latine/x who are estimated to have mental health or substance abuse issues and limited English language proficiency. For many, Spanish language services are required for them to be able to fully participate in their own treatment and recovery.

Table 2: Intersection of SAMHSA’s Data on Substance Use and Mental Health Disorders with United States Census Data on English Language Proficiency

	Latine/x with Mental Health Issues	# Speaking Spanish at Home (66%)	# Limited English Proficiency (26%)
<i>Mental Health Disorder</i>	7,400,000	4,884,000	1,924,000
<i>Substance Use Disorder (SUD)</i>	2,900,000	1,914,000	754,000
<i>Co-Occurring Mental Health and Substance Use Disorder</i>	1,400,000	924,000	364,000
<i>No Co-Occurring Secondary Disorder</i>	7,500,000	4,950,000	1,950,000
<i>Substance Use <u>or</u> Mental Health Disorder</i>	8,900,000	5,874,000	2,314,000

4. Discussion

The authors estimated the mental health service needs of Spanish-speaking individuals with limited English language proficiency. We found there is a need for Spanish-speaking clinicians to treat the 2.3 million Latine/x adults with limited English proficiency and either substance use or mental health disorders. Furthermore, there are an unknown thousands of children with mental and emotional issues that are yet to be counted [56].

There is evidence that the 2.3 million Spanish speakers with limited English proficiency would respond better if services were available in their preferred language [37]. Spanish-speaking clients will more likely reach out for help if they believe they can communicate effectively with their service provider. Actual treatment outcomes will improve if the same provider has both Spanish language proficiency and a cultural understanding of the unique circumstances that have brought the Latine/x client to seek support, and the skills to work from a collectivistic frame, honoring family dynamics [57].

Research has shown that relying on interpretation services alone to reduce disparities does not penetrate the language gap; insufficiently trained professionals often rely on more bilingual family members to deliver HIPAA-protected and other sensitive information, while professional interpreters are rarely specialized in the nuances of mental health assessment and intervention [58-61].

Based upon the SAMHSA survey, it is estimated that 8.9 million Latine/x have either a substance abuse or mental health disorder, with 1.4 million remaining untreated. Of those receiving treatment, it is not clear if the interventions were meaningful and effective. Treatment could mean something as simple as a single visit to a hospital room or one visit to a primary care physician.

Another area of need that was not captured by the SAMHSA 2019 survey is that of children’s mental health. The SAMHSA mental health statistics are only for adults 18 years and older, while substance use statistics capture ages 12 and up. Of note, the Centers for Disease Control and Prevention have found that among all races and ethnicities of children up to 17 years of age, 9.4% had an ADHD diagnosis, 7.4% had diagnosed behavior problems, 7.1% had diagnosed anxiety, and 3.2% of children were diagnosed with depression [56]. If the previous SAMHSA statistics were to include Latine/x children as part of the treatment gap numbers, the total number of Latine/x along with the number of untreated could grow significantly.

Anecdotally, mental health agencies appear to struggle to find Spanish-speaking clinicians. How many are needed? Currently, there are no definitive, authoritative statistics on the number of actual Spanish-speaking mental health professionals available in the United States. The few studies that exist regarding clinicians and available services indicate a significant gap [32,62,63]. The American Psychological Association performed a survey of 4,595 psychologists and found that only 231 (5%) respondents self-reported that they could provide treatment in Spanish (with no indication of how that was measured). Only 5% of the psychologists sampled were Latine/x [63,64]. Bailey and Hogan’s 2019 study points out that disparities vary by region, with some states faring better than others [62]. For example, 48% of the New Mexico population identifies as Latine/x, with only 10% of therapists speaking Spanish. In Texas, 39% are Latine/x, and 10% of therapists speak Spanish. In Arizona, 31% are Latine/x, and 7% of therapists speak Spanish. Similarly, in Nevada, 28% are Latine/x, and 7% of therapists speak Spanish. Furthermore, Pro and colleagues recently found that between 2014

and 2019, the “proportion of facilities offering treatment in Spanish declined by 17.8%, a loss of 1,163 Spanish-speaking mental health facilities” (p.1) [32].

Part of the problem is that the top four states with Latine/x populations, Texas, California, Florida, and New York, are not currently meeting the mental health needs of their general population. Each is considered a Mental Health Provider Shortage Area (MHPSA) and would require a total of nearly 2,300 more psychiatrists to lose that designation [65]. This is in addition to an unknown number of psychiatric nurse specialists, clinical psychologists, social workers, mental health counselors and marriage and family therapists needed as well. It appears there is a need to fill the shortage of both mental health providers in general, as well as providers that can deliver services in Spanish.

4.1 Limitations

The United States Census data is probably under-reporting the number of Americans with Latine/x heritage. A Pew Research Center study reported that 11% of people with Latine/x heritage choose not to self-identify as such [52]. The 11 million or more recent immigrants are likely also underreported. In 2022 alone, the United States Border Patrol detained nearly 2.4 million people at the Southern border, with about 8700-9000 daily allowed to seek asylum [53]. An unknown number also came across the United States Southern border undetected. Thus, accurate estimates of recent immigrants into this country are unavailable [54].

Undocumented individuals may not have been counted in the Census, but they still add to the demand for services and increase agency caseloads. From the perspective of mental health providers ethically delivering services, documentation status is irrelevant to the right to access treatment, though unprotected status enhances barriers and ultimately risks [55].

For this analysis, we assumed that the English language proficiency of those Latine/x with mental health issues is the same as the English language proficiency in the overall Latine/x population. This is only an assumption, and it is likely that among recent immigrants, mental health trauma is greater and English language fluency far lower.

4.2 Future Directions

Two important questions are posed for further follow-up. First, is the Spanish language treatment gap getting smaller, or are we falling behind in our response to improve access and effectiveness? Second, what are training institutions doing to fill the need for linguistically and culturally trained mental health clinicians and staff? The United States is on track to becoming the second-largest Spanish-speaking country in the world by 2060 [50]. We need current training institutions to better understand this need and become inspired to incorporate language-concordant pedagogy in preparing the next generation of mental health staff and clinicians.

The authors also encourage clinicians fluent in the other 350+ languages spoken in the United States, including indigenous languages of Latin America, to take up the charge in developing commensurate language-concordant mental health services for their communities [66]. More work is needed in determining the language-based treatment gaps for those other language groups as well as the Spanish language community.

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References

1. United States Census Bureau. 2020 census statistics highlight local population changes and nation's racial and ethnic diversity. Press Release Number CB21-CN.55. 2021, August 12. <https://www.census.gov/newsroom/press-releases/2021/population-changes-nations-diversity.html>
2. United States Census Bureau. B16001: Language spoken at home by ability to speak English for the population 5 years and over. American Community Survey. 2021a. <https://data.census.gov/cedsci/table?q=Language%20Spoken%20at%20Home&g=0100000United States&tid=ACSDT1Y2021.B16001>
3. Consoli AJ, Flores I. The teaching and training of bilingual (English/Spanish) mental health professionals in the United States. In Rich GJ, Padilla López LA, Ebersohn L, Taylor J, Morrissey S. (Eds.). Teaching Psychology Around the World (Vol. 5, pp. 441-454). Cambridge Scholars. 2020. <http://ebookcentral.proquest.com/lib/sun/detail.action?docID=6119529>
4. Noe-Bustamante L, Mora L, Hugo Lopez M. About one-in-four United States Hispanics have heard of Latinx, but just 3% use it. Pew Research Center. 2020. <https://www.pewresearch.org/hispanic/2020/08/11/about-one-in-four-u-s-hispanics-have-heard-of-Latinx-but-just-3-Use-it/>
5. Garcia JA. How many people in the world speak Spanish? 2022; February 9. <https://www.spanish.academy/blog/how-many-people-speak-spanish-in-the-world/>
6. Calzada EJ, Gulbas L, Hausmann-Stabile C, Kim SY, & Berger Cardoso J. Mental health issues within Latinx populations: Evaluating the state of the field. New and Emerg Issues Latinx Health. 2020;45-62. https://doi.org/10.1007/978-3-030-24043-1_3
7. Lee J, Hong J, Zhou Y, Robles G. The relationships between loneliness, social support, and resilience among Latinx immigrants in the United States. Clin Soc Work J. 2020;48(1):99–109. <https://doi.org/10.1007/s10615-019-00728-w>
8. New American Economy. Power of the purse: The contributions of Hispanic Americans. 2020, February. <https://research.newamericaneconomy.org/report/hispanic-americans-2019/>
9. Zetino YL, Galicia BE, Venta A. Adverse childhood experiences, resilience, and emotional problems in Latinx immigrant youth. Psychiatry Res. 2020;293: 113450. <https://www.sciencedirect.com/science/article/pii/S0165178120331115?via%3Dihub>
10. Villatoro AP, Morales ES, Mays VM. Family culture in mental health help-seeking and utilization in a nationally representative sample of Latinos in the United States: The NLAAS. Am J Orthopsychiatry. 2014;84(4): 353-363. <https://doi.org/10.1037/h0099844>
11. United States Customs And Border Protection. Southwest land border encounters. 2022, October 2021. <https://www.cbp.gov/newsroom/stats/southwest-land-border-encounters>
12. Arthur A. CBP revises up its 2021 estimates of unaccompanied child border arrivals. Center for Immigration Studies. 2021. <https://cis.org/Arthur/CBP-Revises-Its-2021-Estimates-Unaccompanied-Child-Border-Arrivals>
13. Greenberg M. Supporting unaccompanied children in the United States communities where they live. Migration Policy Institute. 2021. <https://www.migrationpolicy.org/sites/default/files/powerpoints/2021.7.21-EVENT%20PWRPNT-%20UC%20Webinar%202021%20--FINAL.pdf>
14. Brabeck KM, Cardoso JB, Chen T, Bjugstad A, Capps R, Capoverde E, Trull A. Discrimination and PTSD among Latinx immigrant youth: The moderating effects of gender. Psychol Trauma. 2022;14(1):11-19. <https://doi.org/10.1037/tra0001126>
15. Murry MD, Nunziato RM, McQueen EL, Bartholomew MW, Marks AK. Xenophobia and discrimination: Consequences for Latinx immigrants and pathways to restoration & healing. Curr Opin Psychol. 2022;48:101438. <https://doi.org/10.1016/j.copsyc.2022.101438>
16. Roschmann S. Impact of migration-related trauma experiences on mental health outcomes of Latinx immigrant youth. Communiqué. 2021;50(1):6-10. <https://www.nasponline.org/publications/periodicals/communiqué/issues/volume-50-issue-1>
17. Doshi M, Lopez WD, Mesa H, Bryce R, Rabinowitz E, Rion R, Fleming PJ. Barriers & facilitators to healthcare and social services among undocumented Latino(a)/Latinx immigrant clients: Perspectives from frontline service providers in Southeast Michigan. PLoS One. 2020;15(6): e0233839. <https://doi.org/10.1371/journal.pone.0233839>
18. Held ML, Nulu S, Faulkner M, Gerlach B. Climate of fear: Provider of Latinx immigrant service utilization. J Racial Ethn Health Disparities. 2020;7(5):901-912. <https://doi.org/10.1007/s40615-020-00714-w>
19. Menendez J, Franco M, Davari J, Gniska PB, Ashby JS. Barriers and facilitators to Latinx college students seeking counseling. J College Stud Psychother. 2020;34(4):302-315. <https://doi.org/10.1080/87568225.2019.1600093>
20. Moreno O, Garcia-Rodriguez I, Fuentes L, Hernandez C, Munoz G, Fluellen K, Hobgood K, Sargent L. Non-Latinx healthcare providers' knowledge and awareness of Latinx geriatric clinical health needs. Clin Gerontol. 2022;46(2):168:179. <https://doi.org/10.1080/07317115.2022.2065943>
21. Bryant DJ, Coman EN, Damian AJ. Association of adverse childhood experiences (ACEs) and substance use disorders (SUDs) in a multi-site safety net healthcare setting. Addict Behav Rep. 2020;12:100293. <https://doi.org/10.1016/j.abrep.2020.100293>
22. Mercado A, Morales F, Torres A, Chen RK, Nguyen-Finn KL, Davalos-Picazo G. Mental health and neurodevelopmental disorders: Examining the roles of familism, social support, and stigma in Latinx caregivers. J Dev Phys Disabil. 2021;33: 653–668. <https://doi.org/10.1007/s10882-020-09765-7>
23. Barajas-Gonzalez RG, Ayón C, Brabeck K, Rojas-Flores L, Valdez CR. An ecological expansion of the adverse childhood experiences (ACEs) framework to include threat and deprivation associated with United States immigration policies and enforcement practices: An examination of the Latinx immigrant experience. Soc Sci Med. 2021;282: 114126. <https://doi.org/10.1016/j.socscimed.2021.114126>

24. Estrada F, Jones IJ, Rivera D, Ramirez A, Cerezo A. Trauma and Latinx sexual-and gender-minority immigrants in the United States. *Curr Opin Psychol.* 2022; 101439. <https://doi.org/10.1016/j.copsyc.2022.101439>
25. Gonzalez-Barrera A, Hugo Lopez M. Before COVID-19, many Latinos worried about their place in America and had experienced discrimination. Pew Research Center. 2020; July 22. <https://www.pewresearch.org/fact-tank/2020/07/22/before-covid-19-many-latino-worried-about-their-place-in-america-and-had-experienced-discrimination/>
26. Ornelas IJ, Yamanis TJ, Ruiz RA. The health of undocumented Latinx immigrants: What we know and future directions. *Annu Rev Public Health.* 2020;41(1): 289-308. <https://doi.org/10.1146/annurev-publhealth-040119-094211>
27. Peña-Sullivan L. The “wrong kind” of immigrants: Pre-migration trauma and acculturative stress among the undocumented Latinx community. *Clin Soc Work J.* 2020;48(4): 351-359. <https://doi.org/10.1007/s10615-019-00741-z>
28. Torres SA, Sosa SS, Flores Toussaint RJ, Jolie S, Butos Y. Systems of oppression: The impact of discrimination on Latinx immigrant adolescents’ well-being and development. *J Res Adolesc.* 2022;32: 501-517. <https://doi.org/10.1111/jora.12751>
29. Vazquez V, Rojas P, Cano MÁ, De La Rosa M, Romano E, Sánchez M. Depressive symptoms among recent Latinx immigrants in South Florida: The role of premigration trauma and stress, postimmigration stress, and gender. *J Trauma Stress.* 2022;35(2): 533–545. <https://doi.org/10.1002/jts.22768>
30. Leza L, Siria S, López-Goni JL, Fernández-Montalvo J. Adverse childhood experiences (ACEs) and substance use disorder (SUD): A scoping review. *Drug Alcohol Depend.* 2021;221: 108563. <https://www.sciencedirect.com/science/article/abs/pii/S0376871621000582?via%3Dihub>
31. López D, Ochoa D, Romero M, Parr K. Integrating Latinx/Hispanic culture, traditions, and beliefs into effective school psychology practice. *Communiqué.* 2020;49(4):16-18. <https://www.nasponline.org/publications/periodicals/communiqué/issues/volume-49-issue-4>
32. Pro G, Brown C, Rojo M, Patel J, Flax C, Haynes T. Downward National Trends in Mental Health Treatment Offered in Spanish: State Differences by Proportion of Hispanic Residents. *Psychiatric Services.* *Psychiatr Serv.* 2022;73:1232–1238. <https://ps.psychiatryonline.org/doi/10.1176/appi.ps.202100614>
33. Ratts MJ, Singh AA, Nassar-McMillan A, Butler SK, Rafferty McCullough J. Multicultural and social justice counseling competencies. Association for Multicultural Counseling and Development. 2015. <https://www.counseling.org/docs/default-source/competencies/multicultural-and-social-justice-counseling-competencies.pdf>
34. Substance Abuse and Mental Health Services Administration [SAMHSA]. Culturally competent LEP and low-literacy services. <https://www.samhsa.gov/CulturallyCompetentLEPandLowLiteracyServices|SAMHSA/section-223/cultural-competency/lep-services>. Accessed 10 April 2023.
35. American Counseling Association. 2014 ACA code of ethics. 2014. <https://www.counseling.org/docs/default-source/default-document-library/2014-code-of-ethics-finaladdress.pdf>
36. United Nations High Commissioner on Refugees. Refugees need better mental health support amid rising displacement. 2022, Oct 14. <https://www.unhcr.org/en-United States/news/press/2022/10/634980ca4/refugees-need-better-mental-health-support-amid-rising-displacement.html>
37. Bailey C, McIntyre E, Arreola A, Venta A. What are we missing? How language impacts trauma narratives. *J Child Adolesc Trauma.* 2019;13(22):153–161. <https://doi.org/10.1007/s40653-019-00263-3>
38. Kleim B, Horn AB, Kraehenmann R, Mehl MR, Ehlers A. Early linguistic markers of trauma-specific processing predict post-trauma adjustment. *Front Psychiatry.* 2018;9:645. <https://doi.org/10.3389/fpsy.2018.00645>
39. Driscoll MW, Torres L. The protective roles of Latinx intercultural competence and acculturation on acculturative stress and depression: A brief longitudinal study. *J Lat Psychol.* 2020;8(2):161-177. <https://doi.org/10.1037/lat0000138>
40. Ward JB, Vines AI, Haan MN, Fernández-Rhodes L, Miller E, Aiello AE. Spanish language use across generations and depressive symptoms among United States Latinos. *Child Psychiatry Hum Dev.* 2019;50(1): 61–71. <https://doi.org/10.1007/s10578-018-0820-x>
41. Interiano-Shiverdecker C, Parikh S, Flowers C, Maghsoudi M. The impact of race-ethnicity on foreign-born students’ counselor self-efficacy and acculturative stress. *J Couns Prep Superv.* 2021;14(3):8. https://digitalcommons.sacredheart.edu/jcps/vol14/iss3/8?utm_source=digitalcommons.sacredheart.edu%2Fjcps%2Fvol14%2Fiss3%2F8&utm_medium=PDF&utm_campaign=PDFCoverPages
42. Sharif H, Mahmood S. Emotional processing in bilinguals: A systematic review aimed at identifying future trends in neurolinguistics. *Humanit Soc Sci Commun.* 2023;10(1):1-12. <https://doi.org/10.1057/s41599-023-01926-1>
43. United States Census Bureau. Census informational bilingual questionnaire. 2020a. <https://www2.census.gov/programs-surveys/decennial/2020/technical-documentation/questionnaires-and-instructions/questionnaires/2020-informational-questionnaire.pdf>
44. United States Census Bureau. The American community survey 2020 questionnaire. 2020b. <https://www2.census.gov/programs-surveys/acs/methodology/questionnaires/2020/quest20.pdf>
45. United States Census Bureau. (2021). B16002: Detailed household language by household limited English speaking status. American Community Survey. 2021b. <https://data.census.gov/cedsci/table?q=Language%20Spoken%20at%20Home&g=0100000United States&tid=ACSDT1Y2021.B16002>
46. United States Census Bureau. S1601: Language spoken at home. American Community Survey. 2021c. <https://data.census.gov/cedsci/table?q=S1601&g=0100000US&tid=ACSST1Y2021.S1601>
47. United States Census Bureau. S1602- Limited English-speaking households. American Community Survey. 2021d. <https://data.census.gov/cedsci/table?q=S1602&g=0100000US>

48. United States Census Bureau. (2021e). S1603- Characteristics of people by language spoken at home. American Community Survey. 2021e. <https://data.census.gov/cedsci/table?q=S1603&g=0100000US>
49. Substance Abuse and Mental Health Services Administration [SAMHSA]. 2019 national survey on drug use and health: Hispanics. United States Department of Health and Human Services. 2020. <https://www.samhsa.gov/data/sites/default/files/reports/rpt31101/2019NSDUH-Hispanic/Hispanic%202019%20NSDUH.pdf>
50. Instituto Cervantes. El español: Una lengua viva. 2021. https://cvc.cervantes.es/lengua/espanol_lengua_viva/pdf/espanol_lengua_viva_2021.pdf
51. U.S. Department of Health and Human Services. Limited English Proficiency. Limited English Proficiency (LEP). <https://www.hhs.gov/civil-rights/for-individuals/special-topics/limited-english-proficiency/index.html>. Accessed April 18, 2023.
52. Lopez MH, Gonzalez-Barrera A, López G. Latino identity declines across generations as immigrant ties weaken. Pew Research Center. 2017, December 20. <https://www.pewresearch.org/hispanic/2017/12/20/hispanic-identity-fades-across-generations-as-immigrant-connections-fall-away/>
53. Roy D. Ten Graphics that Explain the U.S. Struggle with Migrant Flows in 2022. Council on Foreign Relations. <https://www.cfr.org/article/ten-graphics-explain-us-struggle-migrant-flows-2022>
54. Isacson A. Weekly United States-Mexico border update: August migration, Martha's Vineyard, civil liberties. Washington Office on Latin America. 2022; September 23. <https://www.wola.org/2022/09/weekly-u-s-mexico-border-update-august-migration-marthas-vineyard-civil-liberties/>
55. Payan T. Understanding the nexus between undocumented immigration and mental health. *Curr Opin Psychol*. 2022. 101414. <https://doi.org/10.1016/j.copsyc.2022.101414>
56. Centers for Disease Control and Prevention. Data and statistics on children's mental health. <https://www.cdc.gov/childrensmentalhealth/data.html>. Accessed April 16, 2023.
57. Peet CL, Johnson DK. A systematic review of the relationship between familism and mental health outcomes in Latino population. *Front Psychol*. 2016;7:1632. <https://doi.org/10.3389/fpsyg.2016.01632>
58. Snowden LR, McClellan SR. Spanish-language community-based mental health treatment programs, policy-required language-assistance programming, and mental health treatment access among Spanish-speaking clients. *Am J Public Health*. 2013;103(9):1628-1633. <https://doi.org/10.2105/AJPH.2013.301238>
59. Tang AS, Kruger JF, Quan J, Fernandez A. From admission to discharge: Patterns of interpreter use among resident physicians caring for hospitalized patients with limited English proficiency. *J Health Care Poor Underserved*. 2014;25(4):1784-1798. <https://doi.org/10.1353/hpu.2014.0160>
60. Fernandez A, Schillinger D, Grumbach K, Rosenthal A, Stewart A, Wang F, Pérez-Stable EJ. Physician language ability and cultural competence. *J Gen Intern Med*. 2004;19:167-174. <https://doi.org/10.1111/j.1525-1497.2004.30266.x>
61. Flores G, Laws MB, Mayo SJ, Zuckerman B, Abreu M, Medina L, Hardt EJ. Errors in medical interpretation and their potential clinical consequences in pediatric encounters. *Pediatrics*. 2003;111(1):6-14. <https://doi.org/10.1542/peds.111.1.6>
62. Bailey D, Hogan B. Hispanic American mental health care gap to reach almost \$500 million by 2030. *Simple practice*. 2019, October 1. <https://www.simplepractice.com/blog/hispanic-american-mental-health-care-gap/>
63. Hamp A, Stamm K, Lin L, Christidis P. 2015 APA survey of psychology health service providers (512852016-001) [Data set]. American Psychological Association. 2016. <https://doi.org/10.1037/e512015 APA Survey of Psychology Health Service Providers2852016-00>
64. Smith B. Spanish-speaking psychologists in demand. *Monitor on Psychology*. 2018;49(6)
65. Mental Health Care Health Professional Shortage Areas (HPSAs). KFF. Published November 5, 2020. Accessed May 18, 2021. <https://www.kff.org/other/state-indicator/mental-health-care-health-professional-shortage-areas-hpsas/>
66. Translators Without Borders. Language Data for the United States. <https://translatorswithoutborders.org/language-data-for-the-united-states-of-america#:~:text=There%20are%20between%20350%20and,other%20indigenous%20languages%20as%20official.> Accessed April 16, 2023.

Steroid-induced Psychosis in a Patient without a Previous Psychiatric History

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ABSTRACT

This is a 45-year-old Hispanic male with retinitis pigmentosa, no previous psychiatric history, and no known substance use disorder who was treated with 80 mg of oral prednisone, tapered off over 6 weeks before undergoing eye surgery. One week after completing the treatment, he went missing, and when he was found, he described visual and auditory hallucinations, as well as paranoid thoughts. He demonstrated a calm affect, flat mood, decreased expressiveness, poor eye contact, and fluent speech. The thought process was linear and goal-directed. Thought content was negative for hallucinations and paranoia, but delusional, with limited judgment and insight into his current situation. Negative suicidal or homicidal ideations. He was admitted to the hospital for further work up for encephalopathy. Images and laboratory results were irrelevant. The patient's encephalopathy completely resolved the following day, and no antipsychotic medications were administered. The psychiatric assessment was compatible with steroid-induced psychosis based on the acute onset, the brief psychotic episode with complete resolution of symptoms (5 days), precipitated by stressors (combined effects of an incapacitating disease). With this case presentation, we want to raise awareness among primary care physicians of the occurrence of steroid-induced psychosis and highlight the importance of patient education including their caregivers, as the cornerstone for an early recognition and prompt management of neuropsychiatric adverse events of glucocorticosteroids.

Keywords: Steroids, Corticosteroids, Psychosis, Steroids related Delusions, Steroids related Hallucinations, Neuropsychiatric side effects, High-dose prednisone, Hispanic

1. Case Presentation

This is a case of steroid-induced psychosis in a 45-year-old Hispanic male from Venezuela without a previous psychiatric history. His medical history is significant for a rare, hereditary eye disorder, that causes a gradual and complete vision loss called Retinitis Pigmentosa; currently, this disease has no known cure. He was undergoing an investigational gene therapy delivered by subretinal injection in the U.S.A. Prior to the surgery, a high dose of oral prednisone was given starting at 80 mg tapered down over 6 weeks. One week after completing the immunosuppressive treatment, he went missing. A day before going missing, he was reportedly not on his usual self. He blamed his sister for “hacking” his cell phone and moved out of his sister's house. He was found three days later. He described organized visual and auditory hallucinations not threatening in content, as well as paranoid thoughts. He endorsed beliefs such as: ‘doctors implanted a tracking device on my eye’, ‘cars belonging to gangs followed and harassed me’, ‘despite walking for hours, I kept hearing a voice telling me I wouldn't escape’. Additionally, he described hearing high-pitched sounds in both ears.

On admission to the hospital, he was afebrile and hemodynamically stable, but dehydrated, endorsing muscle aches in his legs. He denied any past psychiatric history including symptoms, diagnosis, medications, psychotherapy trials, hospitalizations, self-injurious behavior, self-harm, harm to others, as well as a negative history of neurologic or neurocognitive disorders, and no current or past substance use disorder. Information was confirmed by his sister. His mental status evaluation demonstrated a calm affect, cooperative, flat mood, decreased expressiveness, poor eye contact, low volume but fluent speech, and oriented in person, place, time, and date. His thought process was linear, and goal directed. His thought content was negative for hallucinations and paranoia, but he was delusional, with limited judgment and insight into his current situation. Negative suicidal or homicidal ideations. He was admitted with the initial diagnosis of encephalopathy.

A head scan ruled out acute or chronic intracranial hemorrhage, mass, infection, or infarct. Calf muscles were tender to palpation bilaterally with creatine kinase elevation (3381). Exertional rhabdomyolysis in the setting of walking for long hours was suspected and treated accordingly. Negative test results were obtained for alcohol levels, acetaminophen, salicylates, urine toxicology, HIV, and syphilis. Thyroid studies, cyanocobalamin, thiamine, folate, and ammonia levels were normal, excluding other potential diagnoses like substance use disorder, electrolyte imbalance, infection, and neoplasms; but medication-induced psychotic disorder remained among the possible cause of the patient's psychosis. The patient continued to be stable through the night and the encephalopathy completely resolved the next morning without administering antipsychotic medications.

During the psychiatric evaluation, the patient explained that having vision problems affected his job performance leading to feelings of sadness and frustration. The psychiatric assessment was compatible with steroid-induced psychosis based on the acute onset, complete resolution of symptoms after 5 days, precipitated by stressors (combined effects of an incapacitating disease). There were no indications to start psychotropic medications, and the patient was advised to discuss the episode of steroid-induced psychosis with providers to start antipsychotic medications if future immunosuppressive therapies were needed.

Discussion

There is not much knowledge on the pathophysiology of the neuropsychiatric complications of corticosteroids, however, there is an established correlation between corticosteroids and impairment in cognitive function.^{1,2,3,4,5} It is thought to be related to abnormalities of the hypothalamic-pituitary-adrenal axis, particularly glucocorticoid negative feedback dysfunction.^{1,2,3,5}

The most common and expected side effects of corticosteroid use are an increased risk of infections, leukocytosis, hyperglycemia, gastritis, and weight gain, among others.³ Less frequently, neuropsychiatric manifestations may occur, including steroid-induced psychosis (delusions and hallucinations) as well as, mania, depression, anxiety, insomnia, and irritability.^{3,6,7,8} Individuals may exhibit overt aggression and violence, posing a danger to others; and in the most extreme situations, suicide attempt.^{3,6,9}

Steroid-induced psychosis involves the acute onset of delusions or hallucinations related to corticosteroid therapy causing functional impairment with complete resolution of symptoms within days and up to three or more weeks.² It is considered a substance-induced psychotic disorder by the Diagnostic and Statistical Manual of Mental Disorder, 5th edition (DSM-5).³ A history of neuropsychiatric conditions, drug use disorder, electrolyte imbalance, infections, and neoplasms, is required to be ruled out before making the diagnosis of Steroid-induced psychosis because this is a diagnosis of exclusion.²

The Boston Collaborative Medication Surveillance Program monitored 10,062 hospitalized patients receiving glucocorticoids and identified acute psychiatric reactions in 2.9% of prednisone recipients.^{1,7,11} None of these patients disclosed any prior psychiatric history, and they all experienced complete remission followed by a decrease in the dose of corticosteroids or a brief course of psychopharmacological medication.¹¹

A dose-response correlation was observed in the same study. Individuals who experienced neuropsychiatric side effects received a mean dose of 59.5 mg/day of prednisone, which was greater than the mean dose for patients who did not develop neuropsychiatric complications.¹¹ The incidence of acute psychiatric reactions statistically significantly rose with increasing average daily dosages of prednisone.¹¹ The likelihood of developing steroid-induced psychosis, however, is not predicted by the presence of past psychiatric history.^{3,11}

Multiple investigations indicate that high doses of glucocorticoids (prednisone above 80 mg/day, dexamethasone above 12 mg/day), as well as, a prior history of a glucocorticoid-induced neuropsychiatric disease increase the likelihood that these outcomes would occur.^{1,7,8} However, patients on a daily dose of prednisone above 40 mg should be considered at risk.⁶ Contrary to other study results, the potential risk depends on both the dose and the duration.^{3,7} There is no correlation between the presentation of the glucocorticoid, or the onset of symptoms.^{3,4,5,7,10}

In patients receiving glucocorticosteroids, mania, and delirium are more common among men, while depression is more

likely in women.¹⁰ The chance of developing psychiatric symptoms is decreased overall with subsequent glucocorticosteroid exposure, but individuals who had symptoms during a previous course of glucocorticosteroids are more likely to develop psychiatric symptoms during a second course.¹⁰ In patients older than 70 years of age there is a tenfold increased risk of delirium, mania, and depression; whereas the risk of suicide attempts and panic disorder decreases with age.^{1,10}

The incidence rates of suicidal behaviors and severe neuropsychiatric disorders were studied by Fardet et al., in over 350,000 patients receiving glucocorticoids in primary care settings.¹ The likelihood of committing suicide or suicide attempt during the first course of corticosteroid increased five to sevenfold compared with patients who did not receive corticosteroid.¹

The development of neuropsychiatric effects with corticosteroid use varies between less than 24 hours following the first dose, and up to two years following chronic steroid use.³ According to Lewis et al., in a review of a series of cases of steroid-induced psychiatric complications, 93% of the patients experienced symptoms within 6 weeks of treatment,⁴ with a median treatment time of 11 days.^{4,5,7} However, symptoms can appear at any point during the corticosteroid therapy and may persist even after the drug has been stopped.⁷

The approach to the management of neuropsychiatric side effects of corticosteroids is patient specific. The initial step is the reduction of dosage or therapy withdrawal if feasible, followed by a first-generation antipsychotic (e.g. haloperidol), second-generation antipsychotics (risperidone, olanzapine, quetiapine), lithium, or SSRI in severe cases.^{2,3,5,7}

Complete recovery is expected, in most cases of corticosteroid-induced neuropsychiatric complications.^{3,4,5} In the review of a series of cases by Lewis et al., 93% of the patients had a full recovery, 4% had recurrent psychiatric symptoms, and 3% committed suicide.⁴ The resolution of symptoms is expected within 24 hours after corticosteroid withdrawal, the longest time documented was 8 weeks. Patients who were able to stop taking their steroids experienced a faster remission.³

Although psychosis is considered a multifactorial polygenic disorder, it has also been associated with environmental factors, and it is connected to the onset and progression of stress.¹² In our patient, the stress caused by the impairment of his quality of life resulting from a disabling eye disease along with the high dose immunosuppressive therapy could have affected the hypothalamic-pituitary-adrenal axis, specifically the dysfunction of glucocorticoid negative feedback causing this brief episode of psychosis.^{1,2,3,5}

As a result of their complexity, and unpredictability, corticosteroid-induced neuropsychiatric problems may go undiagnosed, or concealed by other disorders. Acute psychiatric reactions could also be underestimated due to the rapidly self-resolving, mild episode that could result in a failure to diagnose by clinicians. However, psychotic episodes can also be severe and lead to risky behaviors resulting in injury to self or others. In the worst cases, patients could potentially commit suicide as a consequence of their severe symptoms.

There are limited studies on the best practices to prevent negative neuropsychiatric consequences of corticosteroids, however, with this case presentation, we want to raise the awareness of primary care physicians to be cognizant of the potential neuropsychiatric outcomes of the glucocorticoid treatment, including delusions, hallucinations, mania, and suicidality^{3,6,7,8} to provide a comprehensive care.

The authors also want to highlight the importance of patient education including caregivers, as the cornerstone for an early recognition of potential complications of corticosteroid use. Prompt identification of steroid psychosis can lead to expeditious management by primary care physicians in collaboration with other medical professionals like psychiatrists to provide holistic care to their patients including the reduction of dosage or therapy withdrawal if feasible, as well as the administration of a short course of antipsychotic medications in severe cases.^{2,3,5,7}

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References

1. Fardet L, Petersen I, Nazareth I. Suicidal behavior and severe neuropsychiatric disorders following glucocorticoid therapy in primary care. *Am J Psychiatry*. 2012;169(5):491-497. doi:10.1176/appi.ajp.2011.11071009
2. Janes M, Kuster S, Goldson TM, Forjuoh SN. Steroid-induced psychosis. *Proc*. 2019;32(4):614-615. doi:10.1080/08998280.2019.1629223
3. Huynh G, Reinert JP. Pharmacological Management of Steroid-Induced Psychosis: A Review of Patient Cases. *J Pharm Technol*. 2021;37(2):120-126. doi:10.1177/8755122520978534
4. Lewis DA, Smith RE. Steroid-induced psychiatric syndromes. A report of 14 cases and a review of the literature. *J Affect Disord*. 1983;5(4):319-332. doi:10.1016/0165-0327(83)90022-8
5. Ali S, Paul S, Yakkali S, et al. Glucocorticoids-Induced Neuropsychiatric Disorders in Patients With Inflammatory Bowel Disease: A Systematic Review. *Cureus*. 2022;14(9):e28981. doi:10.7759/cureus.28981
6. Naber D, Sand P, Heigl B. Psychopathological and neuropsychological effects of 8-days' corticosteroid treatment. A prospective study. *Psychoneuroendocrinology*. 1996;21(1):25-31. doi:10.1016/0306-4530(95)00031-3
7. Kazi SE, Hoque S. Acute Psychosis Following Corticosteroid Administration. *Cureus*. 2021;13(9):e18093. doi:10.7759/cureus.18093
8. Dubovsky AN, Arvikar S, Stern TA, Axelrod L. The neuropsychiatric complications of glucocorticoid use: steroid psychosis revisited. *Psychosomatics*. 2012;53(2):103-115. doi:10.1016/j.psych.2011.12.007
9. Borman MC, Schmallerberg HC. Suicide following cortisone treatment. *J Am Med Assoc*. 1951;146(4):337-338. doi:10.1001/jama.1951.63670040004007b
10. Brown ES. An epidemiological approach to "steroid psychosis." *Am J Psychiatry*. 2012;169(5):447-449. doi:10.1176/appi.ajp.2012.12020181
11. The Boston Collaborative Drug Surveillance Program. Acute adverse reactions to prednisone in relation to dosage. *Clin Pharmacol Ther*. 1972;13(5):694-698. doi:10.1002/cpt1972135part1694
12. Georgiades A, Almuqrin A, Rubinic P, et al. Psychosocial stress, interpersonal sensitivity, and social withdrawal in clinical high risk for psychosis: a systematic review. *Schizophr* 9, 38 (2023). <https://doi.org/10.1038/s41537-023-00362-z>

Diabetic Retinopathy in Underserved Communities: The SoloKiko Program

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ABSTRACT

Despite major improvements in detection and treatment, diabetic retinopathy is a sight threatening disease which affects underserved communities disproportionately. Minority populations are particularly vulnerable to complications of diabetes, which can be prevented with early lifestyle changes. Oftentimes, there are also cultural and linguistic barriers that delay health-related diagnoses and treatment. This makes sufficient medical education of patients and healthcare providers a potentially effective solution. The SoloKiko program addresses these issues through a culturally competent and sensitive medical educational system about poor lifestyle choices and their outcomes.

This study analyzes the effectiveness of the SoloKiko symposia in educating healthcare providers and community members about DR. No children or members of vulnerable populations were included in the survey. There were 289 adult respondents across four symposia, of whom 47.1% were healthcare providers, and 52.9% were community members. Of the healthcare providers and community members, 80.15% and 62.09% identified as bilingual respectively. These symposia resulted in improvements in the general understanding of DR and its treatment of 94.77% of healthcare providers as compared to 99.35% of community members. The symposia resulted in improved understanding of the importance of addressing healthcare barriers in 94.12% of healthcare professionals and 96.73% of community members. The symposia were equally effective for both bilingual and monolingual members of both groups. Of the six core components of the SoloKiko educational platform, teaching with the language and cultural needs, the use of pictures and storytelling to bridge cultural and linguistic barriers, and using connections with the family experiences appeared most important to both community members and healthcare providers that were either bilingual or monolingual. These are principles that can be used to bridge healthcare interactions between healthcare providers and community members to improve health outcomes.

1. Introduction

Type 2 diabetes has been found to be more prevalent in the United States among racial/ethnic minorities, with an incidence of 8.0-15.1%, as compared to 7.4% in Caucasians.¹ Diabetic retinopathy is a significant potentially blinding complication of diabetes.⁹⁻¹² There are two primary forms of diabetic retinopathy. The first is nonproliferative diabetic or exudative retinopathy, which can result in macular edema, or edema of the retina. The second form of diabetic retinopathy is associated with neovascularization of the retina secondary to ischemia from chronic damage to retinal vasculature, resulting in intraocular bleeding and scarring. Health outcomes of diabetic retinopathy can be improved significantly with adequate control of diabetes, early detection, and early care. The use of laser treatment and anti-VEGF agents have significantly improved treatment of both types of diabetic retinopathy.²⁻⁴ If untreated, diabetic retinopathy can progress to diabetic macular edema, which can significantly damage vision. Poor visual acuity secondary to untreated diabetic retinopathy is suggested to occur at higher rates in medically underserved communities. Studies have shown that

both diabetic retinopathy and macular edema is significantly higher in Black Americans (36.7% and 11.1%) and Hispanics (37.4% and 10.7%) compared to that of Caucasians (24.8% and 2.7%) and Asians (25.7% and 8.9%).⁵ Furthermore, diabetic retinopathy is often underdiagnosed by healthcare professionals and referral to sight saving treatment is often delayed. Diabetic macular edema is presently underdiagnosed approximately 35% of the time.⁸ Diabetic macular retinopathy is also frequently associated with systemic complications such cardiovascular, cerebrovascular, peripheral vascular disease, and renal disease.⁹⁻¹² In order to prevent systemic complications, novel medical interventions are needed to effectively prevent and treat this diagnosis.

In 2010, The National Diabetes Prevention Program was created to address the increase of prediabetes and type 2 diabetes in the United States and reduce its complications. One feature of this program was the Center for Disease Control Lifestyle Change Program, which suggested that people with prediabetes who take part in a structured lifestyle change program can cut their risk of developing type 2 diabetes by 58%.⁷ While lifestyle changes can significantly decrease type 2 diabetes related complications, making these changes can prove difficult for many underserved communities given significant cultural, linguistic, economic and access barriers to healthcare.¹⁶⁻²⁰ One medical intervention to address cultural and linguistic barriers to healthcare may be through patient education.

The SoloKiko Program was established to empower underserved communities with the medical education needed to improve health outcomes of diseases such as diabetic retinopathy. A main part of the program was to promote healthy lifestyle changes by incorporating social structure, culture, and language needs into the learning process. In order to address health barriers these communities face, the SoloKiko educational platform was built around six key core components. Furthermore, its learning platform was also designed to improve awareness in the healthcare workforce serving these communities and to improve detection and treatment.

We report on the results of four symposia given to community members and healthcare providers between December 2022 and April 2023. This research received IRB approval from the California Northstate College of Medicine and was supported by a Health Equity Regional Symposia Sponsorship through Genentech.

2. Materials & Methods

Study Design

This study surveyed healthcare and community members with the aim to assess responses to the symposium, “Diabetic Retinopathy in Underserved Bilingual Communities”. The study utilized a questionnaire to assess responses to and gather individual reflections on the topics addressed in the symposium. The study followed a cross-sectional survey design and sampled populations from the community and healthcare providers.

Materials

The survey was conducted across four symposia supported by a Health Equity Regional Symposia from Genentech. Participants engaged in a symposium before completing the questionnaire. Each symposium consisted of a series of talks given in partnership with SoloKiko Program, a non-profit 501(c)(3) organization committed to health education in bilingual communities historically underserved in healthcare. SoloKiko operates off of the principles of: empowering students and their families through health prevention and education, developing bilingual age-appropriate educational material for students and their families, and promoting health education in underserved communities by partnering with leaders and families.

Upon completing the symposium, participants filled out a questionnaire designed to investigate responses to the topics addressed. Participants were grouped as either healthcare providers or community members. Next, participants were asked to rate the information presented in the symposium on a 4-point Likert scale (‘Excellent’, ‘Good’, ‘Fair’, ‘Poor’). The next question asked whether the information improved the participant’s understanding of diabetic retinopathy and the possible treatments in underserved communities, with answer choices on a 3-point Likert scale (‘Improved Significantly’, ‘Improved’, ‘Did Not Improve’). The following question asked whether the information improved the participant’s understanding of the importance of addressing cultural and linguistic barriers in underserved communities, with answer choices on a 3-point Likert scale (‘Improved Significantly’, ‘Improved’, ‘Did Not Improve’). The following question provided five answer choices to a question asking what the participant believed to be the two most important

aspects of bilingual medical education. The possible selections were listed as follows: “Teach using appropriate language and cultural needs”, “Teach using connections with the family experiences”, “Use bilingual open-ended questions to make the family nucleus think”, “Use of pictures and storytelling to bridge cultural and linguistic barriers”, “Expand vocabulary with repetition and emphasizing words”. The final question asked if the participant spoke more than one language, with the option to select either “Yes” or “No”.

Data Collection & Analysis

No identifiable information was collected from participants of the survey. From December 5, 2022, to April 30, 2023, a total of 289 questionnaires were filled out completely and submitted for analysis. The data from completed questionnaires was immediately filed into spreadsheets designed to organize data collection. A chi-squared test was used to examine the distribution of responses based on the different variables: self-identification (healthcare provider or community member) and bilingual or monolingual participants.

3. Results

Sample size and distribution

Our sample size comprised 289 respondents across 4 symposia held between November 5, 2022, and April 30, 2023. The demographic breakdown included 47.1% healthcare providers and 52.9% community members, as depicted in Figure 1. Among the healthcare providers, 80.15% identified as bilingual, whereas 62.09% of community members reported being bilingual. Of the healthcare providers 19.85% were monolingual, while 37.91% of community members identified as monolingual, as shown in Figure 2.

Figure 1: Sample Size

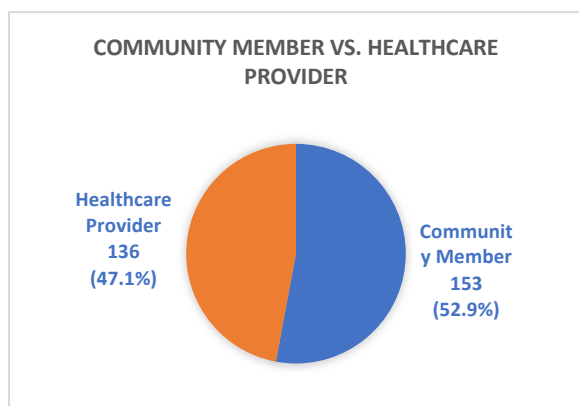
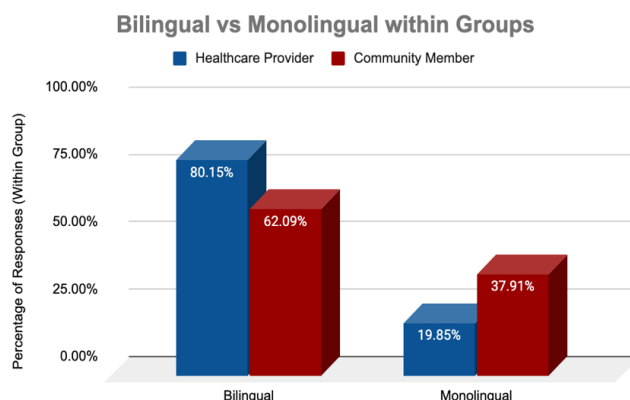


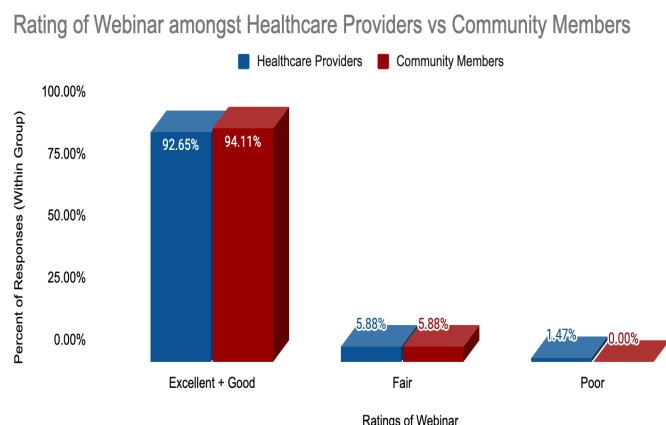
Figure 2: Bilingual vs Monolingual within Groups



Symposia content rating

Participants were asked to rate the overall symposia content. Among Healthcare Providers, 92.64% rated the symposium as either “Excellent” or “Good,” while 94.12% of Community Members rated it as either “Excellent” or “Good.” The results of the chi-squared analysis revealed no statistical significance at $p < 0.05$ between the ratings of Healthcare Providers and Community Members ($X^2 = 2.68$, $df = 3$, $p = 0.444$). This is shown in Figure 3.

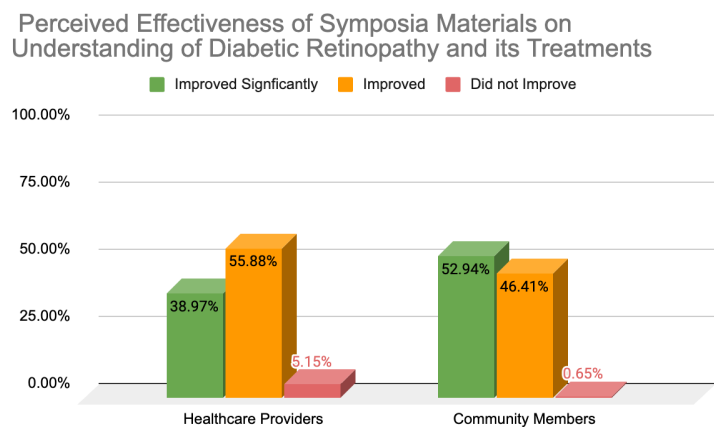
Figure 3: Webinar Content Rating by Group



Improvement in understanding of diabetic retinopathy and its treatment

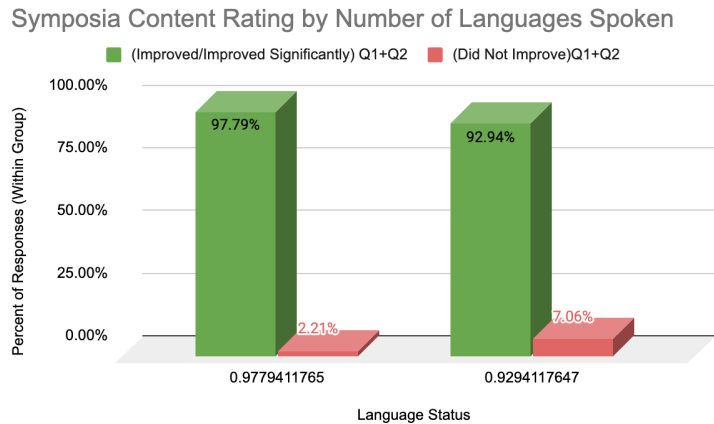
Respondents were then asked to rate the effectiveness of the symposium in improving their understanding of diabetic retinopathy and its treatment. Of the healthcare providers 94.77% responded as either “Improved Significantly” or “Improved” as compared to 99.35% of community members, as shown on Figure 5. Significant Improvement of diabetic retinopathy and its treatment was greater in the community members as compared to healthcare providers. The chi-squared analysis yielded significant results at $p < 0.05$, indicating a significant association between participant type and the level of improvement of understanding of Diabetic Retinopathy and its treatments ($X^2 = 9.5539$, $df = 2$, $p = 0.008422$).

Figure 4: Perceived Effectiveness of Symposia Materials on Understanding of Diabetic Retinopathy and its Treatments of Healthcare Providers and Community Members



Survey results also revealed that 97.79% of bilingual respondents had an “Improved” or “Improved Significantly” response to the improvement of understanding of diabetic retinopathy, whereas 92.94% of monolingual respondents had an “Improved” or “Improved Significantly” response as shown on Figure 5. The chi-squared analysis for Symposia Content Rating by Number of Languages Spoken revealed a significant association at $p < 0.05$ between the number of languages spoken and the symposia content rating for both the “Improved/Improved Significantly” and “Did Not Improve” categories ($X^2 = 8.0718$, $df = 1$, $p = 0.004496$).

Figure 5: Perceived Effectiveness of Symposia Materials on Understanding of Diabetic Retinopathy and its Treatments of Healthcare by Number of Languages Spoken



Improvement in understanding of cultural and linguistic barriers

Respondents were then asked to rate the effectiveness of the symposia in improving their awareness of the cultural and linguistic barriers of underserved communities. Among healthcare professionals, 94.12% experienced either an “Improved” or “Improved Significantly” while 96.73% of community members reported either an “Improved” or “Improved Significantly” as shown on Figure 6. The results were not statistically significant at $p < 0.05$, indicating no significant difference between healthcare professionals and community members in their improved understanding of the importance of addressing linguistic barriers ($X^2 = 1.1455$, $df = 1$, $p = 0.284483$).

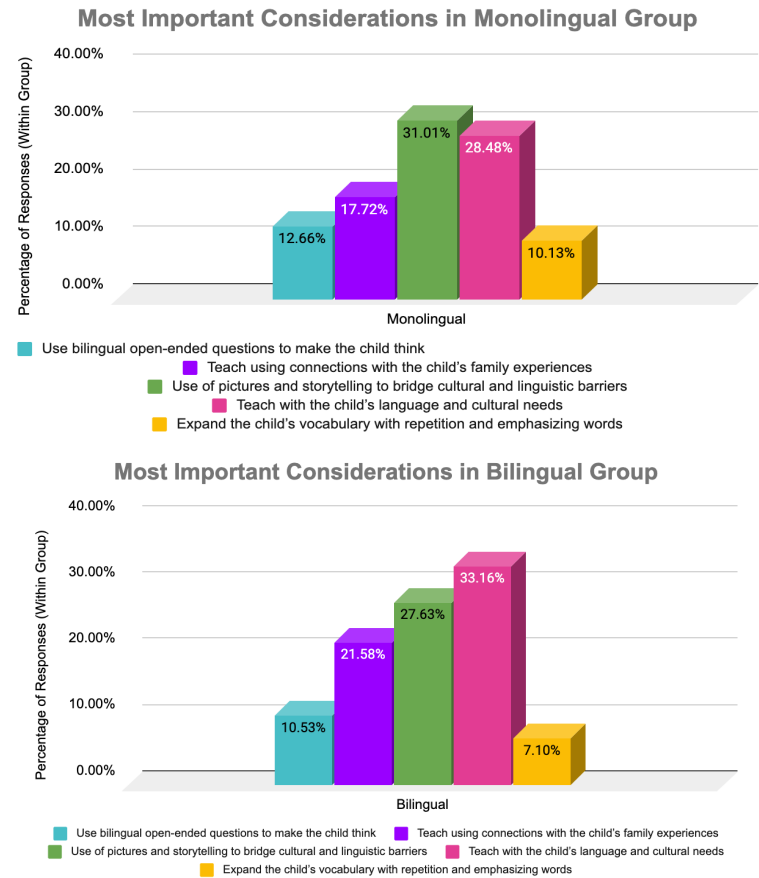
Figure 6: Symposia Improvement in Awareness of Cultural and Linguistic Barriers (Q2)



Importance of the six core educational components of the SoloKiko educational platform

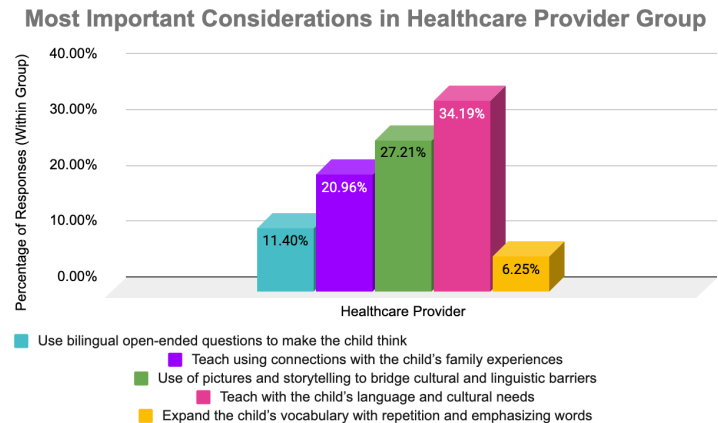
Participants were instructed to choose the two most important core components of the SoloKiko bilingual educational platform based on whether respondents were bilingual or monolingual. “Teach “using language and cultural needs”, “using connections with the family experiences”, and “Use of pictures and storytelling to bridge cultural and linguistic barriers” were rated highest by both groups as seen in Figure 7.1. We used the chi-squared test to examine the distribution of the three most voted for responses. The chi-squared analysis revealed no statistical significant difference between Bilingual and Monolingual groups in the top three most considerations ($X^2 = 1.7056$, $df = 3$, $p = 0.426218$).

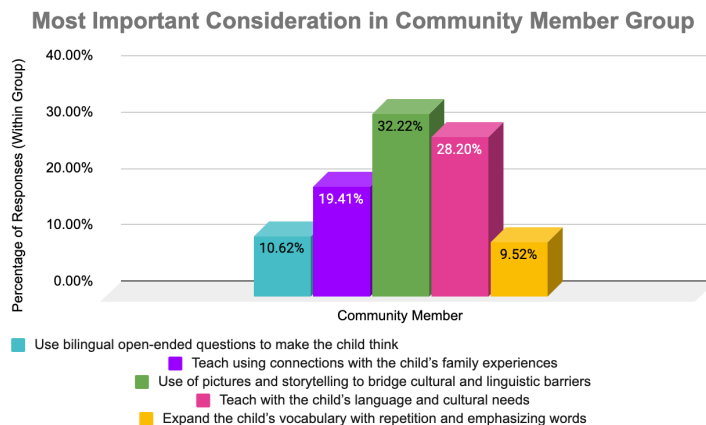
Figure 7.1: Most Important Consideration in Teaching Bilingual Children based on Number of Languages Spoken



Responses were then analyzed on whether respondents were healthcare providers or community members. “Teach “using language and cultural needs”, “using connections with the family experiences”, and “Use of pictures and storytelling to bridge cultural and linguistic barriers” were rated highest by both groups as seen in Figure 7.2. The chi-squared analysis revealed no significant difference at $p < .05$ between group type and perception of most important considerations ($X^2 = 12.7803$ $df = 3$, $p = 0.249041$).

Figure 7.2: Most Important Considerations in Teaching Bilingual Children per Group





4. Discussion

Diabetic retinopathy is one of the leading causes of irreversible blindness in individuals with diabetes.¹³⁻¹⁴ In 2012, Yau et al estimated around 93 million individuals had diabetic retinopathy through projections of the prevalence rate from the 2010 world diabetes population with the prevalence rate expected to rise over the next several decades.¹⁵ Early screening, diagnosis, and treatment can significantly reduce the risk of vision loss in individuals with diabetic retinopathy. Despite advancements in diabetic retinopathy, underserved communities still face significant challenges in accessing resources due to various barriers such as limited access, lack of awareness, and other socioeconomic factors.¹⁶⁻²⁰ These barriers are further compounded by differences in language, culture, and education and can result in lapses in diabetic retinopathy care and subsequent delays in ophthalmic treatment.²¹⁻²²

The National Diabetes Prevention Program results indicate great success in reducing risk of developing type 2 diabetes and its complications through lifestyle modifications.²³⁻²⁴ However, the ability to access the curriculum and other related educational resources remains to be evaluated.²⁵ Inadequate health literacy can compound diabetes-related complications such as diabetic retinopathy, indicating the necessity of interventions in vision care health literacy.²⁶ Also, only about 14.3% of uninsured patients utilize vision care and select population groups such as Hispanics can benefit from tailor-made vision care education.²⁷ It is important to expand and diversify the patient educational resources to bring better awareness to the importance of lifestyle changes to such affected communities. These lapses in care are also compounded by the intricacies and complexities of the healthcare system. In clinical visits, diabetic retinopathy is frequently underdiagnosed, with a significant rate of 35% in underserved communities.⁸ This can be attributed to the insufficient provision of educational materials by healthcare providers to these patients. In other words, this is a problem of lack of access for the community and under detection for the healthcare workforce that serves it. It is important to note that the progression of diabetic retinopathy can lead to a severe condition known as diabetic macular edema, which carries a heightened risk of systemic diseases like cardiovascular, cerebrovascular, peripheral vascular disease, and renal diseases.²⁸⁻²⁹ To address the disparities prevalent in these communities, there is a critical need for a collaborative effort between medical professionals and communities to establish a middle ground in terms of educational materials. By achieving this balance, we can effectively reduce the disparities and improve the overall understanding and management of diabetic retinopathy in underserved populations.

This study aimed to evaluate the effectiveness of the educational platform to convey the understanding of diabetic retinopathy and care for underserved communities. In the study, most respondents, both healthcare providers and community members, rated the symposium highly effective and found improvement in their understanding of diabetic retinopathy and its associated care from the symposium. Most respondents, both healthcare providers and community members, indicated the symposium improved their understanding of addressing cultural/linguistic barriers in underserved communities. Of interest was that in all groups, healthcare providers, community members, bilinguals, and monolingual participants, the symposia proved effective. This is in many ways a validation of the effectiveness of systems like the SoloKiko program that are designed specifically to improve health outcomes for these underserved communities.

Overall, the symposium was effective in improving knowledge of diabetic retinopathy amongst both healthcare providers and community members regardless of language status. Although diabetic patients have basic knowledge about diabetic retinopathy, they have little awareness and connections regarding ongoing care and lifestyle changes. To address this gap, it is crucial to establish public awareness and education programs that emphasize the significance of early detection, lifestyle and treatment for diabetic retinopathy³⁰⁻³¹ Encouragingly, previous studies similarly show webinars, such as diabetic retinopathy educational programs, improved awareness and understanding in targeted populations.³²⁻³³ By implementing such educational initiatives, a substantial difference can be made in improving community awareness and comprehension of diabetic retinopathy, particularly within underserved communities.

In addition, both monolingual and bilingual respondents, whether healthcare providers or community members, indicated the three most important considerations for healthcare teaching were “Teach using the language and cultural needs,” “Use of pictures and storytelling to bridge cultural and linguistic barriers,” and “Teach using connections with family experiences,” respectively. Healthcare providers can incorporate these three principles into their interactions with bilingual patients as well as the educational material they distribute to them. Addressing the disparities in patient-provider communication in underserved areas is needed to improve healthcare quality and safety for patients and families.³⁴ One of the goals of the Solo Kiko Program is to promote understanding of diseases and lifestyle changes much earlier in underserved community. Schools could potentially have an impact on improving community awareness and understanding of diabetic retinopathy and its impact on underserved communities through student education. Several studies have explored the empowerment to lead and encourage students to value diversity and how teachers can approach teaching bilingual children.³⁵⁻³⁷ Future educational materials should consider these approaches and gradually become integrated into methods of treatment from healthcare providers.³⁸⁻³⁹ To accomplish these further studies are needed to establish methods and materials for the teaching standards of effective medical education in underserved communities.

Given little is known about the barriers between communities and healthcare providers, community involvement and outreach leads can lead to greater impact on society when it takes into account the support and social aspect of diabetic retinopathy. The SoloKiko educational platform was established to fill this large void and empower community members to attain health literacy and take control of their eye health. SoloKiko provides culturally-appropriate educational materials that are communicated at the patient’s level for clear understanding and includes up-to-date, evidenced-based explanations to be disseminated amongst family and the community. In the process, SoloKiko brings light to the social determinants of health in diseases such as diabetic retinopathy care and integrates innovative teaching methods into educational materials.

Moreover, investigating the impact of healthcare providers' and community members' language proficiency on patient understanding and care of diabetic retinopathy could yield valuable insights. By identifying the most effective teaching approaches, or a combination thereof, we can aspire to disseminate knowledge about this sight-threatening condition from educational programs to patients' homes, thereby potentially preserving their vision.

Underserved communities require better access to resources, such as the SoloKiko educational platform, provided by healthcare professionals, to bridge the gap and overcome barriers in healthcare services. This can potentially contribute to improving health outcomes for individuals affected by diabetic retinopathy.

The main limitations of our study were those inherent to survey studies. Clearly with such a complex subject we were restricted to a few questions which limited the depth of our information. Most of our respondents were bilingual which is reflective of some though not all underserved communities. We were also not able to capture nonverbal cues or level of limited engagement. Finally, all our respondents were adults which excluded the participation of children.

5. Conclusion

Despite major improvements in detection and treatment, diabetic retinopathy is a sight threatening disease which affects underserved communities disproportionately. These communities face significant health barriers which include access, cultural and linguistic barriers. Even when members of these communities obtain the needed care, diabetic retinopathy can be underdiagnosed as much as 35% by healthcare providers. The SoloKiko educational system can be effective in improving community and healthcare provider knowledge abouts diabetic retinopathy and its treatment. By design, it appears effective in teaching both bilingual and monolingual members of both groups. Of the six core components of the

SoloKiko educational platform teaching with the language and cultural needs, the use of pictures and storytelling to bridge cultural and linguistic barriers, and using connections with the family experiences appear most important to both community members and healthcare providers that are both bilingual and monolingual. These are principles that can be used to bridge educational interactions between healthcare providers and community members to improve health outcomes.

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References

- Centers for Disease Control and Prevention National Diabetes Statistics Report, 2017. Atlanta, Ga, Centers for Disease Control and Prevention, 2017
- Evans JR, Michelessi M, Virgili G. Laser photocoagulation for proliferative diabetic retinopathy. Cochrane Database of Systematic Reviews 2014, Issue 11. Art. No.: CD011234. DOI: 10.1002/14651858.CD011234.pub2. Accessed 10 June 2023.
- Nicholson, B.P., Schachat, A.P. A review of clinical trials of anti-VEGF agents for diabetic retinopathy. Graefes Arch Clin Exp Ophthalmol 248, 915–930 (2010). <https://doi.org/10.1007/s00417-010-1315-z>
- Alessandro Arrigo, Emanuela Aragona & Francesco Bandello (2022) VEGF-targeting drugs for the treatment of retinal neovascularization in diabetic retinopathy, Annals of Medicine, 54:1, 1089-1111, DOI: 10.1080/07853890.2022.2064541
- Diabetic Retinopathy in a Multi-ethnic Cohort in the United States. American Journal of Ophthalmology, Volume 141, Issue 3, March 2006, Pages 446-455.e1
- Knowler WC, Barrett-Connor E, Fowler SE, et al.; Diabetes Prevention Program Research Group . Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. N Engl J Med 2002;346:393–403
- Mona AU Young, Tannaz Moin, Caroline R. Richardson, and Laura J. Damschroder. The Diabetes Prevention Program for Underserved Populations: A Brief Review of Strategies in the Real World Diabetes Spectr. 2019 Nov; 32(4): 312–317.doi: 10.2337/ds19-0007
- Wallick et al. Ophthalmic Surg Lasers Imaging Retina. 2015.
- NHANES 2005-2008, projected to 2012 US population.
- Centers for Disease Control (www.cdc.gov. accessed June 9. 2014): Saaddine JB et al. Arch Ophthalmol. 2008;126(12):1740-1747.
- BioTrends Research Group, TreatmentTrends®: Diabetic Retinopathy/Diabetic Macular Edema (U.S.) 2013.
- Proprietary Quantitative Market Research (n=103 retina specialists, n=23,994 DME eyes with central involvement); fielded November 2013
- Hashemi, H., Yekta, A., Jafarzadehpur, E. et al. The prevalence of visual impairment and blindness in underserved rural areas: a crucial issue for future. Eye 31, 1221–1228 (2017). <https://doi.org/10.1038/eye.2017.68>
- Saaddine JB, Honeycutt AA, Narayan K MV, Zhang X, Klein R, Boyle JP. Projection of Diabetic Retinopathy and Other Major Eye Diseases Among People With Diabetes Mellitus: United States, 2005-2050. Arch Ophthalmol. 2008;126(12):1740–1747. doi:10.1001/archophth.126.12.1740
- Yau JW, Rogers SL, Kawasaki R, Lamoureux EL, Kowalski JW, Bek T, Chen SJ, Dekker JM, Fletcher A, Grauslund J, Haffner S, Hamman RF, Ikram MK, Kayama T, Klein BE, Klein R, Krishnaiah S, Mayurasakorn K, O'Hare JP, Orchard TJ, Porta M, Rema M, Roy MS, Sharma T, Shaw J, Taylor H, Tielsch JM, Varma R, Wang JJ, Wang N, West S, Xu L, Yasuda M, Zhang X, Mitchell P, Wong TY; Meta-Analysis for Eye Disease (META-EYE) Study Group. Global prevalence and major risk factors of diabetic retinopathy. Diabetes Care. 2012 Mar;35(3):556-64. doi: 10.2337/dc11-1909. Epub 2012 Feb 1. PMID: 22301125; PMCID: PMC3322721.
- Patel D, Ananthakrishnan A, Lin T, Channa R, Liu TYA, Wolf RM. Social Determinants of Health and Impact on Screening, Prevalence, and Management of Diabetic Retinopathy in Adults: A Narrative Review. J Clin Med. 2022 Nov 30;11(23):7120. doi: 10.3390/jcm11237120. PMID: 36498694; PMCID: PMC9739502.

17. Cindy X. Cai, Diep Tran, Tina Tang, Wilson Liou, Keith Harrigan, Emily Scott, Paul Nagy, Hadi Kharrazi, Deidra C. Crews, Scott L. Zeger, Health Disparities in Lapses in Diabetic Retinopathy Care, *Ophthalmology Science*, Volume 3, Issue 3, 2023, 100295, ISSN 2666-9145, <https://doi.org/10.1016/j.xops.2023.100295>.
18. Murchison AP, Hark L, Pizzi LT, et al. Non-adherence to eye care in people with diabetes. *BMJ Open Diabetes Research and Care* 2017;5:e000333. doi: 10.1136/bmjdr-2016-000333
19. S.E. Baumeister, G. Schomerus, R.M. Andersen, F. Tost, M.R.P. Markus, H. Völzke, C. Jürgens, Trends of barriers to eye care among adults with diagnosed diabetes in Germany, 1997–2012, *Nutrition, Metabolism and Cardiovascular Diseases*, Volume 25, Issue 10, 2015, Pages 906-915, ISSN 0939-4753, <https://doi.org/10.1016/j.numecd.2015.07.003>.
20. Zhang X, Saaddine JB, Lee PP, et al. Eye Care in the United States: Do We Deliver to High-Risk People Who Can Benefit Most From It? *Arch Ophthalmol*. 2007;125(3):411–418. doi:10.1001/archophth.125.3.411
21. D. Cavan, L.E. Makaroff, J. da Rocha Fernandes, S. Karuranga, M. Sylvanowicz, J. Conlon, D. Chaney, A. Malhi, J. Barratt, Global perspectives on the provision of diabetic retinopathy screening and treatment: Survey of health care professionals in 41 countries, *Diabetes Research and Clinical Practice*, Volume 143, 2018, Pages 170-178, ISSN 0168-8227, <https://doi.org/10.1016/j.diabres.2018.07.004>.
22. Hazem Abdelmotaal, Walid Ibrahim, Mohamed Sharaf, Khaled Abdelazeem, "Causes and Clinical Impact of Loss to Follow-Up in Patients with Proliferative Diabetic Retinopathy", *Journal of Ophthalmology*, vol. 2020, Article ID 7691724, 8 pages, 2020. <https://doi.org/10.1155/2020/7691724>
23. Ann L. Albright, Edward W. Gregg, Preventing Type 2 Diabetes in Communities Across the U.S.: The National Diabetes Prevention Program, *American Journal of Preventive Medicine*, Volume 44, Issue 4, Supplement 4, 2013, Pages S346-S351, ISSN 0749-3797, <https://doi.org/10.1016/j.amepre.2012.12.009>.
24. Campione JR, Ritchie ND, Fishbein HA, Mardon RE, Johnson MC Jr, Pace W, Birch RJ, Seeholzer EL, Zhang X, Proia K, Siegel KR, McKeever Bullard K. Use and Impact of Type 2 Diabetes Prevention Interventions. *Am J Prev Med*. 2022 Oct;63(4):603-610. doi: 10.1016/j.amepre.2022.04.002. Epub 2022 Jun 16. PMID: 35718629; PMCID: PMC10015596.
25. Valaree Villegas, Alisha Shah, JoAnn E. Manson, Deirdre K. Tobias, Prevention of type 2 diabetes through remotely administered lifestyle programs: A systematic review, *Contemporary Clinical Trials*, Volume 119, 2022, 106817, ISSN 1551-7144, <https://doi.org/10.1016/j.cct.2022.106817>.
26. Schillinger D, Grumbach K, Piette J, et al. Association of Health Literacy with Diabetes Outcomes. *JAMA*. 2002;288(4):475–482. doi:10.1001/jama.288.4.475
27. Lee DJ, Lam BL, Arora S, et al. Reported Eye Care Utilization and Health Insurance Status Among US Adults. *Arch Ophthalmol*. 2009;127(3):303–310. doi:10.1001/archophth.2008.567
28. Osama A. Sorour, Emily S. Levine, Caroline R. Bauman, Ayman G. Elnahry, Phillip Braun, Jessica Girgis, Nadia K. Waheed, Persistent diabetic macular edema: Definition, incidence, biomarkers, and treatment methods, *Survey of Ophthalmology*, Volume 68, Issue 2, 2023, Pages 147-174, ISSN 0039-6257, <https://doi.org/10.1016/j.survophthal.2022.11.008>.
29. Thuan M. Diep, Irena Tsui, Risk factors associated with diabetic macular edema, *Diabetes Research and Clinical Practice*, Volume 100, Issue 3, 2013, Pages 298-305, ISSN 0168-8227, <https://doi.org/10.1016/j.diabres.2013.01.011>.
30. Nwanyanwu KMJH, Nunez-Smith M, Gardner TW, Desai MM. Awareness of Diabetic Retinopathy: Insight From the National Health and Nutrition Examination Survey. *Am J Prev Med*. 2021 Dec;61(6):900-909. doi: 10.1016/j.amepre.2021.05.018. Epub 2021 Aug 21. PMID: 34426057; PMCID: PMC8608699.
31. Joseph M. Coney, Adrienne W. Scott, Racial disparities in the screening and treatment of diabetic retinopathy, *Journal of the National Medical Association*, Volume 114, Issue 2, 2022, Pages 171-181, ISSN 0027-9684, <https://doi.org/10.1016/j.jnma.2021.12.011>.
32. Khalaf FR, Fahmy HM, Ibrahim AK, Mohamed GA, El Sayed Ez Eldeen M, Elkady A, Hetta HF. Does a diabetic retinopathy educational program raise awareness among elderly diabetic patients? *Diabetes Metab Syndr Obes*. 2019 Sep 20;12:1867-1875. doi: 10.2147/DMSO.S208072. PMID: 31571961; PMCID: PMC6759836.
33. Arash Fereydooni, Joel L. Ramirez, Shernaz S. Dossabhoy, Anand Brahmandam, Alan Dardik, Cassius Iyad Ochoa Chaa, A national post-Match webinar panel improves knowledge and preparedness of medical students interested in vascular surgery training, *Journal of Vascular Surgery*, Volume 71, Issue 5, 2020, Pages 1733-1740.e5, ISSN 0741-5214, <https://doi.org/10.1016/j.jvs.2019.08.282>.
34. Glenn Flores, Culture and the patient-physician relationship: Achieving cultural competency in health care, *The Journal of Pediatrics*, Volume 136, Issue 1, 2000, Pages 14-23, ISSN 0022-3476, [https://doi.org/10.1016/S0022-3476\(00\)90043-X](https://doi.org/10.1016/S0022-3476(00)90043-X).
35. Doris Y.L. Leung, Engle Angela Chan, Arkers K.C. Wong, Sonia Reisenhofer, Marie Stenberg, Chan Pui Sze, K.H. Lai, Enrique Cruz, Elisabeth Carlson, Advancing pedagogy of undergraduate nursing students' cultural awareness through internationalization

webinars: A qualitative study, *Nurse Education Today*, Volume 93, 2020, 104514, ISSN 0260-6917, <https://doi.org/10.1016/j.nedt.2020.104514>.

36. Victor Moin, Anna Breitzkopf, Mila Schwartz, Teachers' views on organizational and pedagogical approaches to early bilingual education: A case study of bilingual kindergartens in Germany and Israel, *Teaching and Teacher Education*, Volume 27, Issue 6, 2011, Pages 1008-1018, ISSN 0742-051X, <https://doi.org/10.1016/j.tate.2011.04.003>.
37. Gwerfyl Wyn Roberts, Fiona Elizabeth Irvine, Peter Reece Jones, Llinos Haf Spencer, Colin Ronald Baker, Cen Williams, Language awareness in the bilingual healthcare setting: A national survey, *International Journal of Nursing Studies*, Volume 44, Issue 7, 2007, Pages 1177-1186, ISSN 0020-7489, <https://doi.org/10.1016/j.ijnurstu.2006.03.019>.
38. Xuanping Zhang, Susan L. Norris, Jinan Saadine, Farah M. Chowdhury, Tanya Horsley, Sanjat Kanjilal, Carol M. Mangione, Ralf Buhrmann, Effectiveness of Interventions to Promote Screening for Diabetic Retinopathy, *American Journal of Preventive Medicine*, Volume 33, Issue 4, 2007, Pages 318-335, ISSN 0749-3797, <https://doi.org/10.1016/j.amepre.2007.05.002>.
39. Cristina Castillo-Rodríguez, Raúl Cremades, Iván López-Fernández, Storytelling and teamwork in the bilingual classroom at university: Impressions and satisfaction from pre-service teachers in the Kamishibai project, *Thinking Skills and Creativity*, Volume 45, 2022, 101098, ISSN 1871-1871, <https://doi.org/10.1016/j.tsc.2022.101098>.

Medication Concordance of Low-Income, Hispanic Patients at a Volunteer Clinic

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ABSTRACT

Among the Hispanic/Latino communities in the United States, medication adherence is lower than white, non-Hispanic and other minority communities. Although medication adherence has been studied extensively, little research has studied medication concordance, or patients' perceived understanding of medication specifics compared to their actual understanding. A sample of 50 Hispanic/Latino participants was taken from a volunteer, low-income clinic in St. George, UT. Overall, low concordance was seen with medication dosages and side effects.

Participant concordance with medication indications and side effects was significantly associated with provider trust, concordance with medication indication was significantly associated with taking medications as prescribed, and concordance with medication specifics was associated with participant language proficiency and preferences. These findings show a quantitative measure of patient medication concordance and its association with healthcare outcomes, reinforcing the need for increasing patient trust, educating patients on medication specifics, and addressing language barriers.

Keywords: *Medication Adherence, Hispanic or Latino, Risk Factors, Patient-Centered Care, Trust, Medication Concordance*

1. Introduction

According to National Data, there are roughly 62.1 million registered Latinos living in the United States, comprising 18.9% of the total population.¹ When compared to the health of non-Hispanic Whites, Hispanics/Latinos are at higher risk of developing obesity, lower respiratory diseases, liver disease, influenza, pneumonia, kidney disease and suicide.² A contributing factor to this perceived lower quality of health is suspected to be medication adherence.³ Medication adherence refers to patients taking their medications as prescribed by their physician and following correct medication instructions (e.g., dosage, frequency).⁴ Medication adherence is crucial to eradicate infection, maintain health status, and prevent worsening of disease.³ Medication adherence of Hispanic patients in the United States is much lower than non-Hispanic whites and contributes to increased healthcare disparities.³ Many factors contribute to lower adherence rates including demographics,⁵ socio-economic status,³ and language barriers.⁶

Medication adherence has been studied extensively in the Hispanic population. Research articles that study adherence across diseases (e.g., diabetes,⁷ hypertension³) and risk factors (e.g., costs,⁸ discrimination,³ language barriers⁹) demonstrate the disparities of minority communities in comparison to the white, non-Hispanic population. Studying risk factors of medication adherence can identify areas for improved patient healthcare outcomes. Many risk factors, such as patient understanding¹⁰ and confidence,¹¹ influence medication adherence and can be directly addressed by physicians.

Physicians often overestimate patient medication concordance¹² due to factors such as language barriers.⁵ In a study on diabetes, patients with Limited English Proficiency (LEP) who were paired with language-discordant physicians were

more likely to have poor glycemic control compared to LEP patients with language-concordant physicians.¹² While pharmacists have a multidisciplinary goal in helping patients maintain adherence to medicine,¹³ physicians are often the primary source of information for patients and can supplement the information provided from the pharmacist.¹⁴ Therefore, measuring medication concordance and identifying areas for improvement, from a clinical perspective, is crucial to improving Hispanic/Latino patient care.

A study evaluating medication adherence and concordance amongst low-income Hispanic patients reported variations in participant perceived and actual comprehension of healthcare instructions, demonstrating an overestimation of comprehension in most areas.¹⁵ Of interest, participants showed lower understanding of medication dosage and side effects. Another study demonstrated that 87% of caregivers thought it was easy to remember medication names, yet only 46% of reported names were concordant.¹⁶ As patient understanding of medications is an integral part of medication adherence, more research is warranted to identify concordance variations in other populations. Therefore, our aim in this study is to measure the medication concordance of low-income Hispanic patients at a free clinic to further the evidence of its relation to adherence. Patients arguably have the most impactful role in medication adherence and dissonance in their ability to fully understand the specifics of their medications can have negative impacts on their adherence and healthcare outcomes.

2. Methods

Participants

Participants were recruited from the Doctor's Volunteer Clinic, a low-income clinic serving those without insurance. The clinic is located in St. George, UT, a city that is 12.5% Hispanic.¹ After completion of survey collection, medication lists were taken from the clinic's electronic health record system for comparison. Participant information was de-identified with numerical IDs before analyses began. Inclusion criteria included being Hispanic, a patient treated at the Doctor's Volunteer Clinic in St. George, UT, Spanish or English speaking, 18 years or older, taking prescribed medications, and being able to answer the questionnaire on their own (excluding interpretation, writing capabilities, or technological capacity). Exclusion criteria included being a non-Hispanic, non-patient being treated at the Doctor's Volunteer Clinic in St. George, UT, speaking a language other than Spanish or English, being younger than 18 years of age, and not taking prescribed medications. The Doctor's Volunteer Clinic in St. George, UT follows these additional criteria for its patients: patients must not have private insurance or government-provided insurance, such as Medicaid or Medicare, and patients must meet the financial guidelines of living 200% below the federal poverty level.

Survey

Data was collected through paper, electronic, and verbal survey formats. All paper and verbal data points were entered into Qualtrics for data analysis alongside the electronic entries. The survey was designed to investigate medication concordance, an understudied risk factor for medication adherence in the Hispanic population. The survey questions were created part in de novo and part by following validated and published questionnaires, including the Care Transitions Measure (CTM),¹⁷ Trust in Physician Scale,¹⁸ and adapted medication questions¹⁵. The survey was translated by advanced working proficiency and native speaking investigators into Spanish and administered in the preferred language of the participants by the same bilingual researchers. The surveys are available in English and Spanish as Supplementary materials.

Statistical Analysis

All analyses were performed on SAS STAT v.9.4. (SAS Institute Inc. Cary NC). Descriptive statistical frequencies, means and deviation were calculated for all variables using PROC FREQ or PROC MEANS. Associations for continuous variables were evaluated using Wilcoxon Rank Sum Score nonparametric tests using PROC NPARIWAY and Spearman's correlation tests PROC CORR, non-parametric tests were used because normality assumption were not met. Statistical significance was declared at $p \leq 0.05$.

Results

Data from a total of 50 participants were collected over a period of 5 months from August to December in 2023. Twenty-eight participants (56%) were male and 22 (44%) were female (Table 1). Most were married, with a mean age of 45

years, and with a high school education. Participants were overwhelmingly of Mexican descent [34 (73.9%)] and 68.9% reported not having a primary care doctor. Nearly all participants spoke Spanish as a native language (95.8%) and more than half preferred to speak Spanish (63.6%). Self-reported English proficiency varied among participants. Spoken English proficiency was nearly identical between positive (well, very well) and negative (not well, not at all) responses [25 (51%) and 24 (49%) respectively]. Nearly the same was observed with English reading proficiency, although there were more participants that answered, “not at all”. A majority of participants stated their doctor spoke their preferred language during the encounter (62%) and did not use an interpreter during the visit (56%). Twenty-eight participants (58%) did not receive any written instructions after their visit and, of those who received written instructions, 14 (70%) received instructions in their preferred language.

Table 1: Participant Demographics, Language Preferences, and Clinical Encounter Details

Category	Frequency (%) N = 50	Preferred Language	
Sex		English	11 (25)
Female	22 (44)	Spanish	28 (63.64)
Male	28 (56)	Both	5 (11.36)
Marital Status		No answer	6
Married	18 (60)	English Speaking Proficiency	
Single	12 (40)	Not at all	7 (14.29)
No answer	20	Not well	18 (36.73)
Highest Education Level		Well	12 (24.49)
K12	15 (34.09)	Very Well	12 (24.49)
High School	22 (50)	No answer	1
Higher Education	7 (15.91)	English Reading Proficiency	
No answer	6	Not at all	11 (23.4)
Birthplace		Not well	12 (25.53)
Chile	1 (2.17)	Well	12 (25.53)
El Salvador	2 (4.35)	Very Well	12 (25.53)
Guatemala	5 (1.87)	No answer	3
México	34 (73.91)	Doctor Spoke Preferred Language	
USA	3 (6.52)	Yes	31 (62)
Venezuela	1 (2.17)	No	19 (38)
No answer	4	Used an Interpreter for the Visit	
Have a Primary Care Doctor		Yes	22 (44)
Yes	14 (31.11)	No	28 (56)
No	31 (68.89)	Did you receive written instructions?	
No answer	5	Yes	20 (41.67)
Native Language		No	28 (58.33)
English	2 (4.17)	No answer	2
Spanish	46 (95.83)	Were the written instructions in your preferred language?	
No answer	2	Yes	14 (70)
		No	6 (30)

Table continues...

3. Self-Reported Confidence and Medication Concordance

The rating scale was converted numerically for analysis (not at all = 1, not well = 2, well = 3, very well = 4). Participant self-reported confidence was very high in all categories (Table 2). Subsequent comparison of reported versus documented medication specifics showed decreases across nearly all categories with the largest decrease in dosages and side effects. The highest variation in concordance was seen in medication name (standard deviation=0.432).

Table 2: Participant confidence and concordance of medication specifics [mean (standard deviation)]

	Name	Indication	Dosage	Frequency	Side Effects
Confidence	0.840 (0.252)	0.904 (0.186)	0.840 (0.255)	0.888 (0.21)	0.788 (0.26)
Concordance	0.681 (0.432)	0.909 (0.292)	0.301(0.405)	0.640 (0.423)	0.154 (0.349)

We analyzed medication concordance scores with participant age, self-reported trust in physician, self-reported adherence to medications, and number of medications using Spearman Correlation Coefficients (Table 3). Concordance to medication indication was significantly associated with both trust in the doctor ($p < 0.0001$) and taking medications as prescribed ($p < 0.0001$). Concordance with medication frequency was also significantly associated with trust in the doctor ($p < 0.01$). Age, number of medications, medication name, medication strength, and medication frequency did not show any significant associations.

Using Wilcoxon Rank Sum Scores, we compared medication concordance data with participant data from Table 1. Participants with higher self-reported English reading proficiency had higher medication side effect concordance ($Pr > \text{ChiSq } 0.046$). Participants who received written instructions in their preferred language had higher concordance with medication side effects and indication ($Pr > \text{ChiSq } 0.053$ and $Pr > \text{ChiSq } 0.025$, respectively). All other analyses did not present significant association scores.

Table 3: Spearman's correlation coefficients (rho) and p values for medication concordance variables compared with participant measures variables. Statistically significant correlations are indicated by an asterisk (*).

	Patient Age	Patients reports trusting the doctor	Patient reports taking Medication as Prescribed	Number of Medications
Medication name	$\rho = 0.067$ $P = 0.641$	$\rho = 0.038$ $P = 0.7944$	$\rho = 0.190$ $P = 0.1863$	$\rho = 0.193$ $P = 0.1786$
Medication indication	$\rho = -0.197$ $P = 0.1709$	$\rho = 0.610$ $P < 0.0001^*$	$\rho = 0.547$ $P < 0.0001^*$	$\rho = 0.046$ $P = 0.7512$
Medication dose strength	$\rho = -0.079$ $P = 0.5844$	$\rho = 0.221$ $P = 0.1236$	$\rho = 0.081$ $P = 0.5763$	$\rho = -0.005$ $P = 0.9716$
Medication usage frequency	$\rho = -0.53$ $P = 0.7147$	$\rho = 0.250$ $P = 0.0795$	$\rho = 0.124$ $P = 0.3923$	$\rho = 0.033$ $P = 0.8219$
Medication side effects	$\rho = 0.157$ $P = 0.2776$	$\rho = 0.385$ $P = 0.0058^*$	$\rho = 0.339$ $P = 0.0160$	$\rho = 0.013$ $P = 0.9302$

4. Discussion

Our research focuses on analyzing patients' perceived knowledge of medications to the actual medication information (i.e., medication concordance) as a component of Hispanic medication adherence. Previous research suggests that Hispanic patients would score low on concordance in most domains.¹⁵ However, we find that only two categories show low concordance - dosages and side effects.

Participant concordance with medication indications and side effects is significantly associated with provider trust. The more trust the participant had with their provider, the more likely they were to identify the purpose for taking a medication and recognize side effects that may occur from taking the medications. These findings provide a qualitative assessment of medication concordance in association with a participant's trust in the healthcare system that has not yet been described in the literature, nor has it been studied in an underserved, Hispanic population. This data demonstrates the potential for improved patient medication adherence through competent and empathetic care. Healthcare professionals seeking to improve adherence should focus on the patient-physician relationship to promote outcomes.

Concordance with medication indication is also significantly associated with taking medications as prescribed. This is an expected result; participants who do not understand the reason for taking a medication may be less likely to continue taking said medication.¹⁹ It may be that those who are struggling with medication adherence would benefit from education related to the medication's purpose. Providers might consider using teach-back methods to identify patients at risk of non-adherence and ensure adequate understanding of medications.²⁰

Our data shows associations between participant language proficiency and preferences with medication specifics. Those who reported higher English reading proficiency better understood side effects. This is expected; patients often receive written instructions regarding their medications²¹ and those who are better able to read these handouts would be more aware of potential medication side effects. Additionally, participants who received written instructions in their preferred language may have better understood medication side effects and indications. These findings provide evidence suggesting that participants who are less comfortable using or unable to use a language different than their preferred language may

have less comprehension of instructions they receive, regardless of the method of communication. Physicians should strive to eliminate language barriers to promote better medication understanding and adherence.

These findings have clinical applications. As discussed, understanding of medication specifics is associated with trust in the healthcare provider and improved medication adherence. Healthcare providers can find ways to improve trust with their patients which may improve their understanding of side effects and the purpose for taking medications, therefore improving adherence. Additionally, patient education on medication indications may also improve adherence and patient healthcare outcomes. Finally, the effects of language barriers should be addressed by healthcare systems to improve patient medication understanding, specifically regarding side effects and indications. For those who are not proficient in reading English, Spanish-language written and/or verbal instructions should be provided to ensure adequate understanding.

Our study has limitations. The sample size is small compared to larger studies on adherence. However, for this specific population and the unique aspects of medication concordance studied, data from 50 participants is comparable to other studies.²²⁻²⁴ Additionally, the data was self-reported by participants. This may over- or underestimate the confidence levels of patients; in the future, pharmacy records or other quantitative methods could be used to improve reporting.

Future studies should focus on interventions to improve medication adherence and increase patient concordance. Methods for trust-building between physicians and Hispanic patients can be studied with medication concordance to identify the most successful interventions to bridge perceived and reported understanding. Additionally, methods of patient education on medications in the physician's office, especially on side effects and indications, should be studied (e.g., defining which methods of teaching help patients to retain information regarding medications more effectively). Alternatively, researchers could collaborate with physicians and pharmacists to create novel programs to increase patient concordance in the physician's office and reinforce understanding through subsequent pharmacy education.

5. Conclusion

Medication adherence is low among Hispanic/Latino populations living in the United States and little research has studied medication concordance as a contributing factor. This study is the first we are aware of that studies medication concordance, medication adherence, and healthcare interactions among low-income, Hispanic/Latino patients. Overall, participants show lower concordance with medication dosages and side effects. First, there are significant associations between provider trust and concordance with medication indications and side effects, indicating that improved trust with patients may improve adherence and understanding. Next, concordance with medication indication was associated with taking medications as prescribed. Addressing patient misunderstanding or lack of understanding of medication indication may also improve adherence. Finally, there is an association between language proficiency and preference and understanding of medication side effects. Addressing language barriers may improve patient understanding and therefore adherence and healthcare outcomes. These findings demonstrate that the quantitative measure of medication concordance is an area of interest to explore medication adherence and is something that may be addressed to improve adherence rates for Hispanic/Latino patients in the United States.

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Conflict of Interest Disclosure: The project mentors, Drs. Bigam and Wardle, volunteer at the Doctor's Volunteer Clinic. However, data collection was performed by other project members on days when these physicians were not seeing patients. The authors have no other conflicts of interest to disclose.

IRB Approval: Institutional Review Board (IRB) approval was obtained through the Rocky Vista University IRB before participants were recruited. The IRB granted this study exempt status. IRB #2022-087.

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Supplementary Materials

Supplement A: Questionnaire in English

HMC Research Questionnaire - ENGLISH Rocky Vista University, COM; IRB #: 2022-087					
What is your name?*					
What is your date of birth?*					
*This information will only be used to find your chart for your visit today. All the information collected will be de-identified and your name will not appear with any of the information you provide.					
Participant identifier: _____					
Please answer all the following questions. If you are unsure about what a question means or how to complete a section, please ask the researcher.					
What is your ethnicity?	☐ Hispanic or Latino ☐ Not Hispanic or Latino				
Where were you born?					
What is your native language?					
What is your preferred language?					
How well do you speak English?	☐ Not at all ☐ Not well ☐ Well ☐ Very well				
How well do you read English?	☐ Not at all ☐ Not well ☐ Well ☐ Very well				
Do you have a Primary Care doctor?	☐ Yes ☐ No				
Did your doctor today speak your preferred language?	☐ Yes ☐ No				
Did you use an interpreter for today's visit?	☐ Yes ☐ No				
- If yes, was this interpreter a family member?	☐ Yes ☐ No				
Did you receive written instructions for today's visit?	☐ Yes ☐ No				
- If yes, were they in your preferred language?	☐ Yes ☐ No				
Please rate your agreement with the following statements:	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. When I leave the clinic, I know the names of my medications.	☐	☐	☐	☐	☐
2. When I leave the clinic, I know the purpose for taking each of my medications.	☐	☐	☐	☐	☐
3. When I leave the clinic, I know the strength/dose of my medications.	☐	☐	☐	☐	☐
4. When I leave the clinic, I know how often to take my medications.	☐	☐	☐	☐	☐
5. When I leave the clinic, I know the possible side effects of each of my medications.	☐	☐	☐	☐	☐
6. I trusted my doctor and I will try to follow his/her advice.	☐	☐	☐	☐	☐
7. I normally take my medications as prescribed.	☐	☐	☐	☐	☐
- 7a. If you do not strongly agree, what makes it difficult to take your medications as prescribed?					

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HMC Research Questionnaire - ENGLISH Rocky Vista University, COM; IRB #: 2022-087	
Are you taking any prescribed medications currently?	☐ Yes ☐ No
If yes, how many are you taking?	☐ Unsure
If you answered yes, please fill out a box for each PRESCRIBED medication you are taking.	
DO NOT use any information UNLESS it was given to you at the clinic.	
If you are taking more medications than you can fit on the page, please let the researcher know.	
Medication #1	
1. What is the name of the medication?	☐ Unsure
2. Was this medication prescribed today?	☐ Yes ☐ No
3. Have you taken this medication before?	☐ Yes ☐ No
- If yes, how long have you taken this for?	☐ Unsure
3. What is the medication used for?	☐ Unsure
4. What is the strength/dose of the medication?	☐ Unsure
5. How often should you take the medication?	☐ Unsure
6. How long should you take the medication?	☐ Unsure
7. What side effects can this medication cause?	☐ Unsure
Medication #2	
1. What is the name of the medication?	☐ Unsure
2. Was this medication prescribed today?	☐ Yes ☐ No
3. Have you taken this medication before?	☐ Yes ☐ No
- If yes, how long have you taken this for?	☐ Unsure
3. What is the medication used for?	☐ Unsure
4. What is the strength/dose of the medication?	☐ Unsure
5. How often should you take the medication?	☐ Unsure
6. How long should you take the medication?	☐ Unsure
7. What side effects can this medication cause?	☐ Unsure
Medication #3	
1. What is the name of the medication?	☐ Unsure
2. Was this medication prescribed today?	☐ Yes ☐ No
3. Have you taken this medication before?	☐ Yes ☐ No
- If yes, how long have you taken this for?	☐ Unsure
3. What is the medication used for?	☐ Unsure
4. What is the strength/dose of the medication?	☐ Unsure
5. How often should you take the medication?	☐ Unsure
6. How long should you take the medication?	☐ Unsure
7. What side effects can this medication cause?	☐ Unsure

2

Supplement B: Questionnaire in Spanish

HMC Research Questionnaire - SPANISH Rocky Vista University, COM; IRB #: 2022-087					
¿Cuál es su nombre?*					
¿Cuál es su fecha de nacimiento?*					
*Esta información solo se utilizará para encontrar su expediente médico de su visita de hoy. Toda la información recopilada será de forma anónima y su nombre no aparecerá.					
Participant identifier: _____					
Por favor, conteste las siguientes preguntas. Si no entiende una pregunta o no sabe cómo responder a una sección, pregunte al investigador.					
¿Cuál es su origen étnico?	☐ Hispano o Latino ☐ No Hispano o Latino				
¿Dónde nació?					
¿Cuál es su idioma nativo?					
¿Cuál es su idioma preferido?					
¿Qué tan bien habla el inglés?	☐ Para nada ☐ No muy bien ☐ Bien ☐ Muy bien				
¿Qué tan bien lee el inglés?	☐ Para nada ☐ No muy bien ☐ Bien ☐ Muy bien				
¿Tiene un(a) doctor(a) de atención primaria?	☐ Sí ☐ No				
¿Su doctor(a) de hoy habló en su idioma preferido?	☐ Sí ☐ No				
¿Usó un intérprete en la visita de hoy?	☐ Sí ☐ No				
- Si es así, ¿fue un miembro de su familia?	☐ Sí ☐ No				
¿Recibió instrucciones escritas en la visita de hoy?	☐ Sí ☐ No				
- Si es así, ¿fueron escritas en su idioma preferido?	☐ Sí ☐ No				
Por favor, marque cuanto está de acuerdo con las siguientes declaraciones:	Estoy en completo desacuerdo	No estoy de acuerdo	Estoy sin criterio	Estoy de acuerdo	Estoy en completo acuerdo
1. Al salir de la clínica, sé los nombres de mis medicamentos.	☐	☐	☐	☐	☐
2. Al salir de la clínica, sé por qué estoy tomando mis medicamentos.	☐	☐	☐	☐	☐
3. Al salir de la clínica, sé la fuerza/dosis de mis medicamentos.	☐	☐	☐	☐	☐
4. Al salir de la clínica, sé con qué frecuencia tomar mis medicamentos.	☐	☐	☐	☐	☐
5. Al salir de la clínica, sé los posibles efectos secundarios de mis medicamentos.	☐	☐	☐	☐	☐
6. Confío en mi doctor(a) y trataré de seguir sus consejos.	☐	☐	☐	☐	☐
7. Normalmente tomo mis medicamentos según lo prescrito.	☐	☐	☐	☐	☐
- 7a. Si no está en completo acuerdo, ¿qué es lo que le hace difícil tomar sus medicamentos según lo prescrito?					

1

HMC Research Questionnaire - SPANISH Rocky Vista University, COM; IRB #: 2022-087	
¿Está tomando medicamentos recetados actualmente?	☐ Sí ☐ No
Si es así, ¿cuántos medicamentos toma?	☐ Inseguro
Si la respuesta anterior era "SÍ", por favor rellene un cuadro por cada medicamento RECETADO que toma.	
NO utilice recursos externos A MENOS QUE se les fueron dados por la clínica.	
Avisé al investigador si toma más medicamentos de lo que le permite la hoja de papel.	
Medicamento #1	
1. ¿Cómo se llama el medicamento?	☐ Inseguro
2. ¿Se recetó el medicamento hoy?	☐ Sí ☐ No
3. ¿Ha tomado este medicamento antes?	☐ Sí ☐ No
- Si es así, ¿por cuánto tiempo lo ha tomado?	☐ Inseguro
3. ¿Para qué se utiliza este medicamento?	☐ Inseguro
4. ¿Qué es la fuerza/dosis del medicamento?	☐ Inseguro
5. ¿Con qué frecuencia debe tomar este medicamento?	☐ Inseguro
6. ¿Por cuánto tiempo debe tomar este medicamento?	☐ Inseguro
7. ¿Cuáles son los posibles efectos secundarios de este medicamento?	☐ Inseguro
Medicamento #2	
1. ¿Cómo se llama el medicamento?	☐ Inseguro
2. ¿Se recetó el medicamento hoy?	☐ Sí ☐ No
3. ¿Ha tomado este medicamento antes?	☐ Sí ☐ No
- Si es así, ¿por cuánto tiempo lo ha tomado?	☐ Inseguro
3. ¿Para qué se utiliza este medicamento?	☐ Inseguro
4. ¿Qué es la fuerza/dosis del medicamento?	☐ Inseguro
5. ¿Con qué frecuencia debe tomar este medicamento?	☐ Inseguro
6. ¿Por cuánto tiempo debe tomar este medicamento?	☐ Inseguro
7. ¿Cuáles son los posibles efectos secundarios de este medicamento?	☐ Inseguro
Medicamento #3	
1. ¿Cómo se llama el medicamento?	☐ Inseguro
2. ¿Se recetó el medicamento hoy?	☐ Sí ☐ No
3. ¿Ha tomado este medicamento antes?	☐ Sí ☐ No
- Si es así, ¿por cuánto tiempo lo ha tomado?	☐ Inseguro
3. ¿Para qué se utiliza este medicamento?	☐ Inseguro
4. ¿Qué es la fuerza/dosis del medicamento?	☐ Inseguro
5. ¿Con qué frecuencia debe tomar este medicamento?	☐ Inseguro
6. ¿Por cuánto tiempo debe tomar este medicamento?	☐ Inseguro
7. ¿Cuáles son los posibles efectos secundarios de este medicamento?	☐ Inseguro

2

References

1. U.S. Census Bureau. U.S. Census Bureau QuickFacts: United States. Census.gov. Published 2020. Accessed July 24, 2022. <https://www.census.gov/quickfacts/fact/table/US/RH1725221#RH1725221>
2. Office of Minority Health. Profile: Hispanic/Latino Americans. HHS.gov. Published 2020. Accessed April 6, 2023. <https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=3&lvlid=64>
3. Alvarez C, Hines AL, Carson KA, et al. Association of Perceived Stress and Discrimination on Medication Adherence among Diverse Patients with Uncontrolled Hypertension. *Ethn Dis*. 2021;31(1):97-108. doi:10.18865/ED.31.1.97
4. World Health Organization. Adherence to Long-term Therapies Evidence for Action. *Ann Saudi Med*. 2004;24(3):221-222. doi:10.5144/0256-4947.2004.221
5. Bidwal M, Lor K, Yu J, Ip E. Evaluation of asthma medication adherence rates and strategies to improve adherence in the underserved population at a Federally Qualified Health Center. *Res Soc Adm Pharm*. 2017;13(4):759-766. doi:10.1016/j.sapharm.2016.070.007
6. McQuaid EL. Barriers to medication adherence in asthma: The importance of culture and context. *Ann Allergy Asthma Immunol*. 2018;121(1):37-42. doi:10.1016/j.anai.2018.030.024
7. Vijayaraghavan M, Jacobs EA, Seligman H, Fernandez A. The association between housing instability, food insecurity, and diabetes self-efficacy in low-income adults. *J Health Care Poor Underserved*. 2011;22(4):1279-1291. doi:10.1353/hpu.2011.0131
8. Frankenfield DL, Wei II, Anderson KK, Howell BL, Waldo D, Sekscenski E. Prescription medication cost-related non-adherence among Medicare CAHPS respondents: disparity by Hispanic ethnicity. *J Health Care Poor Underserved*. 2010;21(2):518-543. doi:10.1353/hpu.00.0314
9. Villagran M, Hajek C, Zhao X, Peterson E, Wittenberg-Lyles E. Communication and culture: Predictors of treatment adherence among Mexican immigrant patients. *J Health Psychol*. 2012;17(3):443-452. doi:10.1177/1359105311417194
10. Banuelos Mota A, Feliz Sala EE, Perdomo JM, et al. Assessing Barriers to Medication Adherence Among Latinos with Diabetes: a Cross-sectional Study. *J Gen Intern Med*. 2020;35(2):603-605. doi:10.1007/s11606-019-05041-3
11. Brown MT, Bussell JK. Medication adherence: WHO cares? *Mayo Clin Proc*. 2011;86(4):304-314. doi:10.4065/mcp.20100.0575
12. Fernandez A, Schillinger D, Warton EM, et al. Language barriers, physician-patient language concordance, and glycemic control among insured Latinos with diabetes: the Diabetes Study of Northern California. *J Gen Intern Med*. 2011;26(2):170-176. doi:10.1007/s11606-010-1507-6
13. Presley B, Groot W, Pavlova M. Pharmacy-led interventions to improve medication adherence among adults with diabetes: A systematic review and meta-analysis. *Res Soc Adm Pharm*. 2019;15(9):1057-1067. doi:10.1016/j.sapharm.2018.090.021
14. Tavakoly Sany SB, Behzad F, Ferns G, Peyman N. Communication skills training for physicians improves health literacy and medical outcomes among patients with hypertension: a randomized controlled trial. *BMC Health Serv Res*. 2020;20(1):60. doi:10.1186/s12913-020-4901-8
15. Glick AF, Farkas JS, Rosenberg RE, et al. Accuracy of Parent Perception of Comprehension of Discharge Instructions: Role of Plan Complexity and Health Literacy. *Acad Pediatr*. 2020;20(4):516-523. doi:10.1016/j.acap.2020.010.002
16. Halterman JS, Auinger P, Conn KM, Lynch K, Yoos HL, Szilagyi PG. Inadequate Therapy and Poor Symptom Control among Children with Asthma: Findings from a Multistate Sample. *Ambul Pediatr*. 2007;7(2):153-159. doi:10.1016/j.jambp.2006.110.007
17. Coleman EA, Mahoney E, Parry C. Assessing the Quality of Preparation for Posthospital Care from the Patient's Perspective: The Care Transitions Measure. *Med Care*. 2005;43(3):246-255. doi:10.1097/00005650-200503000-00007
18. Anderson LA, Dedrick RF. Development of the Trust in Physician scale: a measure to assess interpersonal trust in patient-physician relationships. *Psychol Rep*. 1990;67(3 Pt 2):1091-1100. doi:10.2466/pr0.1990.67.3f.1091
19. Halm EA, Mora P, Leventhal H. No Symptoms, No Asthma: The Acute Episodic Disease Belief Is Associated With Poor Self-Management Among Inner-City Adults With Persistent Asthma. *Chest*. 2006;129(3):573-580. doi:10.1378/chest.129.3.573
20. Tamura-Lis W. Teach-back for quality education and patient safety. *Urol Nurs*. 2013;33(6):267-273. doi:10.7257/1053-816X.2013.33.6.267
21. Shiffman S, Gerlach KK, Sembower MA, Rohay JM. Consumer understanding of prescription drug information: an illustration using an antidepressant medication. *Ann Pharmacother*. 2011;45(4):452-458. doi:10.1345/aph.1P477
22. Baghikar S, Benitez A, Fernandez Piñeros P, Gao Y, Baig AA. Factors Impacting Adherence to Diabetes Medication Among Urban, Low Income Mexican-Americans with Diabetes. *J Immigr Minor Health*. 2019;21(6):1334-1341. doi:10.1007/s10903-019-00867-9
23. Caballero AE. Understanding the Hispanic/Latino Patient. *Am J Med*. 2011;124(10, Supplement):S10-S15. doi:10.1016/j.amjmed.2011.070.018
24. Gao X, Nau DP, Rosenbluth SA, Scott V, Woodward C. The relationship of disease severity, health beliefs and medication adherence among HIV patients. *AIDS Care*. 2000;12(4):387-398. doi:10.1080/09540120050123783

A Virtual Pilot of a Multispecialty Group Mentoring Program for Underrepresented in Medicine (URiM) Trainees and Faculty

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ABSTRACT

Background: Underrepresented in medicine (URiM) trainees and faculty often face limited mentorship and an increased sense of isolation in academic medicine. The objective of this pilot study was to determine if transitioning the Mentoring in Inclusion and Diversity program, a group mentoring model for URiM physicians spanning career levels and specialties, from an in-person to a virtual format during the COVID-19 pandemic was feasible and acceptable.

Methods: MIND involves mentoring within multispecialty “families” composed of URiM medical students, residents, fellows, and faculty. A series of workshops comprises the formal program, which in 2020, transitioned to a virtual format. We applied the Context, Input, Process and Product (CIPP) evaluation model for continuous improvement of workshops. Through surveys, we elicited participants’ perceptions of engagement and helpfulness for each workshop, general feedback, and suggestions for improvement. Survey responses were analyzed descriptively, and open-ended comments were content-analyzed.

Results: For the 2020-2021 academic year, the authors grouped 111 participants across 10 families and organized 6 virtual workshops on the following topics: How to be a Mentor, Meeting your MIND Family, Imposter Syndrome, Microaggressions, two Career Mentor Spotlights, and a book club. The CIPP model facilitated iterative improvements. Participants viewed workshops, on average, as being helpful (87%) and engaging (88%). Participants reported enjoyment of small groups, connecting with other URiM physicians, and desire for increased time for family discussions.

Conclusions: The MIND group mentoring model was feasible and acceptable in a virtual format.

Keywords: *Mentoring, Under-represented in medicine, Diversity and Inclusion*

1. Background

The lack of diversity at all levels in academic medicine is a well-documented problem: Hispanic physicians represent less than 7% of the physician workforce¹ and African American/Black physicians represent less than 6% of the physician workforce, despite their respective populations in the United States being 19% and 13%.² The American Association of Medical Colleges (AAMC) defines underrepresented in medicine (URiM) as “those racial and ethnic populations that are underrepresented in the medical profession relative to their numbers in the general population.”³ URiM trainees and faculty face unique challenges. As early as medical school orientation, students report tension between stated and perceived institutional values of diversity.⁴ Trainees report facing microaggressions and bias in the workplace.⁵ URiM faculty report workplace discrimination,⁶ inadequate mentorship and a decreased sense of belonging,⁷ an experience exacerbated by the COVID-19 pandemic.⁸ Although these challenges require systemic changes, mentorship programs for URiM individuals could mitigate some of these issues.⁹

Mentoring programs do exist in some institutions, but these typically use a dyad model (pairing of a mentor and mentee), often with mentors who are not URiM.¹⁰ There is some evidence to suggest that group mentoring models may be more beneficial than dyad models. In one study, medical students reported group mentoring models fostered more effective mentor-mentee relationships compared to dyad models.¹¹ Moreover, programs commonly target a specific training level and/or specialty or area of focus, or they focus on the near-peer mentorship experience as mentors.¹² Few examples exist¹³ of mentoring programs led by and for URiM physicians that involve a group model of mentoring participants at all levels of training from medical students to faculty. We found no examples in the literature of this type of model across multiple specialties. The lack of group models of mentorship for URiM physicians across career levels constrains the ability of academic spaces to foster belonging and inclusion for this group.

The University of Pennsylvania Health System (UPHS) and Children's Hospital of Philadelphia (CHOP) Alliance of Minority Physicians (AMP) adopted a group mentoring model for their Mentoring Families program in 2012. The overarching mission of Mentoring Families is to connect URiM medical students, residents, fellows, and faculty across a variety of adult and pediatric medical and surgical specialties and facilitate mentoring relationships with peers, near-peers, and more senior mentors. In March 2020, with the onset of the COVID-19 pandemic and the cancelation of in-person events, we were inspired to think creatively about sustaining community for URiM trainees and faculty and avoid exacerbating isolation. The objective of this pilot study was to determine if transitioning the in-person mentoring program to a virtual platform using Zoom (Zoom Video Communications, Inc., San Jose, California) was feasible and acceptable. We briefly describe the recent in-person program before the transition to a virtual format and report on feedback from participants and key stakeholders obtained by applying the Concept, Input, Process, Product (CIPP) evaluation model¹⁴ and lessons learned.

2. Methods

Setting and Participants

During the summer welcome reception hosted by AMP, invitations to the Mentoring Families program were extended to new and current self-identified URiM medical students, trainees, and faculty from UPHS, CHOP and the Perelman School of Medicine at the University of Pennsylvania. In 2020, the program was rebranded as the Mentoring in Inclusion and Diversity program. Participation was voluntary, and invitees could express interest in joining a MIND mentoring family at the AMP welcome reception or online through the reception invitation email. Invitations were also emailed to URiM trainees and faculty included in the AMP listserv and to medical students in the Latino Medical Student Association and the Student National Medical Association.

Upon receiving the invitations, participants who were interested in joining were instructed to complete a detailed REDCap sign-up survey via an attached link, which included questions about medical school, current specialty, hobbies, the person's path to medicine, previous experience with other mentoring programs, desired topics/content of the program, and scheduling preferences. Sign-up survey responses were used to thoughtfully assign members into mentoring "families" based on common interests, consistent with the Goodness of Fit model¹⁵ which posits that the quality of mentorship relationship is a function of the goodness of fit between mentors and mentees on preferences, incentives, and valuations. Additionally, we preserved existing relationships such as the medical school's URiM "buddy system" (pairing first-year students with more senior students) by placing these students in the same family. MIND mentoring families consisted of 10-12 members with an intentionally balanced selection of URiM attending physicians, fellows, residents, and medical students combined with representation from diverse specialties in each family.

MIND Workshops

The in-person version of the MIND program included a series of 3 core hour-long workshops distributed throughout the academic year which evolved in keeping with participant needs. Core workshop topics included: Meeting your MIND Family, Imposter Syndrome, and Microaggressions. In-person workshops were conducted in a large lecture room during late afternoon/evening hours and dinner was provided. Participants would join their mentoring families at their assigned tables and sessions would begin with establishing ground rules, ensuring a safe and supportive environment for participants to share personal experiences without concern for judgement, repercussion, or gossip. Participants would be introduced to the workshop topic by the program leaders (JR, NB) through an array of modalities including brief video clips, podcast excerpts, or recent articles. Participants were then asked to discuss the topic within their families and were

given printed materials, with a guided activity and/or guided questions to facilitate discussion. Additionally, participants were encouraged to discuss their own personal experiences. This time within families facilitated mentoring around the topic in a semi-structured setting and allowed participants to meet and connect with peers, near peers and senior mentors. With this model, participants could be both a mentee and a mentor. After the family discussion time, a representative from each family shared with the larger group salient themes from their individual family discussions. Finally, members were encouraged to connect outside of the scheduled workshops to further develop their mentoring relationships in an informal manner.

To enable continuing the MIND program in the fall of 2020, program leaders (JR and NB), with the support of AMP leadership, decided to transition all workshops to a virtual platform. In addition, based on feedback we received from members during the prior year, for the 2020/2021 academic year, we added 3 new virtual workshops: How to Be a Mentor (intended for fellows and attending physicians), Career Mentor Spotlight (intended for medical students and residents), and a book club.

In an attempt to mimic the in-person workshops, the virtual workshops also started with a review of the same ground rules to promote a safe virtual environment. This was followed by an introduction to the topic by program leaders. In addition to the aforementioned modalities used in the in-person workshop introduction, we also conducted polls using Poll Everywhere (Poll Everywhere, Inc., San Francisco, CA) and the polling feature within Zoom as an ‘icebreaker’ and to encourage active participation. Instead of within-family discussion around a table, we used the ‘break-out’ feature within Zoom to allow time for family discussion. We again had a guided activity and/or guided questions to facilitate discussion that were emailed in advance and provided in the Zoom chat box during the workshop. After 15-25 minutes of discussion, we would close the break-out rooms and bring everyone back together where representatives from 2-3 families presented salient points, just as in-person. In addition to the scheduled workshops, families were encouraged to meet informally in a socially distanced manner.

3. Analysis

To understand if we were continuing to meet the needs of our members in our completely virtual format, we applied Stufflebeam’s CIPP evaluation model, a decision-making model that systematically collects information about program planning, structuring, executing, and evaluating activities for continuous improvement.^{14,16} The Context evaluation is particularly useful when an established program must adjust to new conditions. The Input evaluation provides information to help establish the appropriate model that meets participants’ needs. The Process evaluation gathers ongoing data that will guide modifications for continuous improvement. Product evaluation provides information to evaluate program outcomes.

During the last 5 minutes of each virtual workshop, members were encouraged to complete an online REDCap survey prior to logging off to aid us in evaluating the program Product (workshops). The survey was created by authors (JR, NB) who sought internal feedback from medical education expert (HLA) on survey clarity and usability and incorporated this in the final iteration of the survey. In the survey, members were asked to rate each workshop by level of engagement and helpfulness on a 0-100 scale (0=very unhelpful, 100=very helpful) and to provide general feedback and suggestions for improvement.

Descriptive statistics were reported for the two quantitative questions asked in the post-workshop REDCap survey. Demographic information obtained during the sign-up survey was obtained from all participants, including level of academic training, racial and ethnic background, gender, generation status and specialty. Finally, two authors (JR, NB) independently reviewed, coded and content analyzed¹⁷ open-ended survey responses immediately after workshops and then jointly constructed themes in discussion with the study team. The CHOP Institutional Review Board and the University of Pennsylvania Institutional Review Board reviewed and determined this study be exempt.

4. Results

During the 2020/2021 academic year, 111 participants, (including 48 (43.2%) returning participants), across 15 specialties signed up for MIND, who were grouped across 10 families (Table 1). The most common specialties represented were pediatrics (including subspecialties), anesthesia, and pathology. Families consisted of 3 attending

physicians, 0-2 fellows, 2-3 residents, 2-4 upperclassmen medical students, and 1-2 first-year medical students. Workshop participation ranged from 12-51 participants and the average survey response rate was 59% (Table 2).

Table 1. Characteristics of MIND family participants in the 2020/2021 academic year.

Participants	No. (%)	Third (or higher)-generation American (U.S. born with U.S. born parents)	26 (23.4)
Total number	111 (100)	Other	7 (6.3)
Academic year/training		Specialties represented	
First year medical students	15 (13.5)	Anesthesia	5
Upperclassmen medical student	32 (28.8)	Dermatology	3
Residents	25 (22.5)	Emergency Medicine	3
Fellows	7 (6.3)	Family Medicine	2
Attending physician	32 (28.8)	Nephrology	1
Race and Ethnicity ^a		Neurology	2
American Indian or Alaska Native	5 (4.5)	Obstetrics/Gynecology	3
Asian	6 (5.5)	Orthopedics	1
Black or African American	64 (58.2)	Otorhinolaryngology	1
Latinx	48 (43.6)	Pathology	4
Native Hawaiian or Other Pacific Islander	1 (0.9)	Pediatrics ^b	29
White	43 (39.1)	Psychiatry	3
Gender		Pulmonary	1
Female	82 (73.9)	Radiology	3
Male	28 (25.2)	Trauma Surgery	1
Non-binary/ third gender	0 (0)		
Generation status			
First-generation American (foreign-born)	27 (24.3)		
Second-generation American (U.S. born with at least one foreign-born parent)	51 (45.9)		

^a Participants could select more than one race and ethnicity
^b Includes the following sub-specialties: critical care, developmental and behavioral, emergency medicine, general/hospital pediatrics, hematology/oncology, neonatology, nephrology, neurology, and psychiatry.

4.1 Application of Context, Input, Process, Product (CIPP) Model

Context

Given the pivot to a virtual platform, program leaders (JR, NB) reviewed previous data of the Mentoring Families programming to plan the transition to a virtual format. We discussed what went well and challenges faced with the in-person program with current and former leaders of MIND and AMP and brainstormed potential challenges and plans to overcome them with the virtual program. Finally, we gathered Context information about members using the pre-participation surveys.

Input

The program leaders (JR, NB) discussed and inventoried the Inputs of the program, including budget and technical resources like the Zoom and Poll Everywhere program accounts. Using responses to our sign-up survey as guidance, we selected dates and times for our events and topics for the whole academic year. To inform members of the schedule in

advance, we sent calendar invites, and to avoid scheduling conflicts with other virtual AMP events, we used AMP's Google calendar. We asked for input on preferred duration of workshops from participants and based on their responses.

Table 2. Participation and Evaluations of virtual MIND Workshops, 2020/2021 academic year.

	Workshop						
	<i>How to Be a Mentor</i>	<i>Meeting Your MIND Family</i>	<i>Career Mentor Spotlight #1</i>	<i>Micro-Aggressions</i>	<i>Impostor Syndrome</i>	<i>Career Mentor Spotlight #2</i>	<i>Book Club</i>
	September	September	October	November	January	March	April
Participation ^a							
Total participated/ total invited no. (%)	29/39 (74)	51/111 (46)	16/72 (22)	28/111 (25)	25/111 (22)	8/72 (11)	12/111 (11)
Survey response rate no. (%)	21/29 (72)	35/51 (69)	10/16 (63)	13/28 (46)	16/25 (64)	2/8 (25)	9/12 (75)
Survey Questions (mean score) ^b							
Helpfulness of session	84	79	96	80	91	93	86
Engagement during session	84	77	99	79	93	95	92

^a Medical students and residents only were invited to "Mentor Spotlight" workshops; the "How to Be a Mentor" workshop included only fellows and attending physicians.

^b Respondents were asked to rate how helpful and engaging each of the workshops were on a scale 0-100, 0=very unhelpful, 100=very helpful, with higher scores indicating a more positive experience.

Process

Given the novelty of virtual workshops and in alignment with the CIPP model that recommends iterative evaluations of both Process and Products, MIND co-leaders (JR, NB) debriefed immediately after workshops, reviewed survey responses, and discussed and documented areas of success and improvement for subsequent workshops.

We had anticipated that we would have partial family participation leaving some "break-out" rooms with small numbers of participants. We planned to respond by combining smaller families as needed to form groups of 4-5 individuals at a minimum to promote richer discussion of topics. Efforts were made to ensure that in combining families, groups included a range of career levels, in order to maintain the peer, near-peer and senior mentoring aspects of the program.

Product

Finally, we used the quantitative survey responses as well as the open-ended questions in the survey to inform us if we were meeting our program's objectives. Across the 6 workshops, the mean helpfulness score was 87% and the mean engagement score was 88% (Table 2). The Career Mentor Spotlights were our most highly scored workshops followed by Impostor Syndrome. Participants frequently used the open-ended survey questions to report their feedback. In general, participants enjoyed the sessions, commenting that they appreciated the space to connect with other URiMs. One fellow wrote "great meeting new people and connecting." Participants valued time discussing topics with their families and sharing personal stories. A medical student wrote: "As a med student I love hearing from residents and attendings about how they navigate situations like these 'in real life' so I enjoy the breakouts a lot. Thank you so much for putting these together!"

5. Discussion

The pilot virtual MIND group mentoring model was feasible and acceptable to facilitate connections with other URiM students, trainees, and faculty and provide mentorship opportunities for them. Workshops overall received high ratings in engagement and helpfulness. Additionally, the CIPP evaluation model allowed us to iteratively and holistically improve subsequent workshops to meet our participants' needs.

Providing this virtual space for group mentoring facilitated continued and new relationships and connections with other URiM students, trainees, and faculty across specialties and career levels. This type of mentoring program agrees with that of other interschool mentoring programs¹⁸ that allowed for larger interconnectedness and community-building. The virtual format promoted easy access to mentors from all levels and specialties who are committed to connecting to trainees. Access to faculty¹⁹ and efficient ways²⁰ to identify and meet with faculty mentors are important to mentees. Easy access to near-peer mentors is also beneficial to residents.¹² Our program was able to do both during our virtual workshops.

We intentionally encouraged sharing of personal experiences around the topics presented. This sharing of personal identities and not just professional identities is appreciated by mentees.¹⁹ We worried that we might lose some of the in-person intimacy in the virtual format, however, this was not the case. Participants commented that they were still connecting and able to be as candid as they had been during in-person events.

One of the major benefits of applying the CIPP model was the iterative evaluations that helped us improve the subsequent evaluations. From survey responses after our first two workshops, we learned that participants preferred having more time in break-out rooms. One medical student commented: “Having more time would be helpful so everyone can share their thoughts” and a resident wrote, “A little more time in breakout sessions would be nice.” Thus, we increased the time in breakout rooms in subsequent workshops and noticed increased engagement scores in a subsequent workshop on Impostor Syndrome.

Although we anticipated some differences between in person and virtual workshops, we still had a fast-learning curve with the virtual format. Unexpected challenges of the virtual format included technical difficulties. Specifically, we encountered problems when we attempted to assign families in advance to individual “break-out” rooms. This was due to participants registering for the event with an email address that was not the same as their linked Zoom accounts. We troubleshooted this problem by having a co-leader sort participant into families during the initial 5 minutes of the session, while the other leader began introducing the topic for the workshop. Another issue that was brought up by participants was that sometimes no one stepped up to be lead in the ‘break-out’ rooms and so it would take some time for discussion to get going. We addressed this in subsequent workshops by assigning leaders immediately before the break-out time. Leaders could have been any participant of the group. For example, during one session, we said whoever’s last name is at the end of the alphabet would lead and report back on the family discussion.

An unforeseen positive outcome included an increase in the number of attending physicians who participated, which we attributed to the virtual format and timing of sessions (early evening) facilitating their participation. Our virtual program also required less administrative planning. For example, previously, hosting in-person sessions required co-leaders to handle logistics including reserving adequate space to accommodate participants, printing materials, and arranging for catering. With virtual sessions, co-leaders could focus on updating and presenting workshop materials and using technology to keep participants engaged. An additional benefit was that participants could log on for workshops from anywhere. Finally, our program also ran on a smaller budget (<\$3,000).

The main limitation was attendance, as it hindered our ability to generalize our results. Although we had 111 participants sign up for our mentoring program, we did not expect all would log on to our pilot virtual workshops. For this pilot program, we were targeting 30% of those who signed up to consistently attend. Although our actual participation was, on average, less than this, we were still able to obtain useful pilot data. We also noticed participation declined as the year progressed. We speculate that this was due to fatigue with virtual platforms as well as the general racial and social unrest that was occurring during the winter/spring months as this was supported by several emails we received from participants. The decline in participation in the Spring was again noticed in the subsequent academic year. Other limitations included low response rate to the evaluation survey and limited longitudinal data on participation.

The pilot data we collected provided us with several ideas for next steps. While the 2021/2022 academic year’s program remained virtual due to ongoing COVID restrictions, to encourage participation, we provided participants with a safe food pick-up option prior to sessions and added gift card raffles at the end of sessions. We also on-boarded a pre-medical student volunteer to help with evaluation reminders, attendance tracking, and virtual technical help. Finally, given that not all family members consistently attended workshops, we increased the family size from 10-12 to 15-18 members.

For the 2021/2022 academic year, we held 6 virtual events. Attendance was comparable to the previous year as were our survey response rate and mean scores on our REDCap survey.

We learned various lessons with this virtual pilot mentoring program. Firstly, URiM students, trainees and faculty appreciated the virtual format for continued connections and mentoring opportunities during the pandemic. Additionally, the CIPP evaluation model allowed for iterative improvements of subsequent workshops which was important in this new virtual format. Finally, having committed co-leaders open to incorporating feedback is essential for the program's continued improvements.

For the 2022/2023 academic year the MIND program transitioned back to in person. We do believe some of the workshops, for example meeting your MIND family for the first time, are more conducive in person. However, we also acknowledge the flexibility virtual sessions offer to participants and believe some sessions (e.g., Career mentor spotlight) could effectively continue virtually. Thus, we advocate for a mixed model, some workshops in person only and select workshops virtually, as this expands accessibility and may increase attendance moving forward.

In future evaluation work, we plan to explore in focus groups with members the fluctuation in attendance throughout the year. Additionally, we will explore how the multi-specialty aspect of our program fosters mentoring relationships outside of a participant's specialty. Finally, as a long-term evaluation, we plan to explore how MIND relationships influenced long-term retention of URiM physicians at our institutions.

In conclusion, the pilot virtual MIND mentorship model was feasible and acceptable. The multispecialty model facilitated positive relationships between individuals with different skill sets. During the COVID-19 pandemic, our program was able to create a virtual meeting space for personal and professional community-building, highlighting the importance of mentoring programs as a venue for buffering the effects of racism and the pandemic among URiMs.⁸ Other academic centers may explore using our model to promote mentoring communities for their URiM trainees and faculty, and future work should investigate remaining barriers and evaluate long-term impacts of group mentoring models such as MIND.

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References

1. AAMC 2022 Physician Specialty Data Report Executive Summary; [accessed August 14th, 2023]. <https://www.aamc.org/data-reports/data/2022-physician-specialty-data-report-executive-summary>.
2. United States Census Bureau: Quick Facts; [Accessed August 14th, 2023]. <https://www.census.gov/quickfacts/fact/table/US/RHI725222>
3. AAMC. 2004. Underrepresented in Medicine Definition [accessed August 14th, 2023]. <https://www.aamc.org/what-we-do/equity-diversity-inclusion/underrepresented-in-medicine>.
4. van Buuren A, Yaseen W, Veinot P, Mylopoulos M, Law M. Later is too late: Exploring student experiences of diversity and inclusion in medical school orientation. *Med Teach*. 2021; 43(5):538-545
5. Osseo-Asare A, Balasuriya L, Huot SJ, Keene D, Berg D, Nunez-Smith M, Genao I, Latimore D, Boatright D. Minority Resident Physicians' Views on the Role of Race/Ethnicity in Their Training Experiences in the Workplace. *JAMA Netw Open*. 2018; 1(5):e182723.
6. Filut A, Alvarez M, Carnes M. Discrimination Toward Physicians of Color: A Systematic Review. *J Natl Med Assoc*. 2020; 112(2):117-140.
7. Cora-Bramble D, Zhang K, Castillo-Page L. Minority faculty members' resilience and academic productivity: are they related? *Acad Med*. 2010; 85(9):1492-1498.
8. South-Paul JE, Campbell KM, Poll-Hunter N, Murrell AJ. Mentoring as a Buffer for the Syndemic Impact of Racism and COVID-19 among Diverse Faculty within Academic Medicine. *Int J Environ Res Public Health*. 2021; 18(9).
9. Beech BM, Calles-Escandon J, Hairston KG, Langdon SE, Latham-Sadler BA, Bell RA. Mentoring programs for underrepresented minority faculty in academic medical centers: a systematic review of the literature. *Acad Med*. 2013; 88(4):541-549.
10. Bonifacino E, Ufomata EO, Farkas AH, Turner R, Corbelli JA. Mentorship of Underrepresented Physicians and Trainees in Academic Medicine: a Systematic Review. *J Gen Intern Med*. 2021; 36(4):1023-1034.
11. Barrow B, Meiman J, Davidson A, Simms T. Near-peer mentoring in medical school: Support for a group model. *Med Educ*. 2021; 55(11):1325-1326.
12. Polley C, Cisternino A, Gray A. A novel approach to medical mentoring. *Clin Teach*. 2021; 18(1):37-42.
13. Harris TB, Mian A, Lomax JW, Scott-Gurnell K, Sargent JA, Phillips JL, Mao AR, Thompson B, Searle N, Folensbee-Eddins F et al. The Texas Regional Psychiatry Minority Mentor Network: a regional effort to increase psychiatry's workforce diversity. *Academic psychiatry : the journal of the American Association of Directors of Psychiatric Residency Training and the Association for Academic Psychiatry*. 2012; 36(1):60-63.
14. Stufflebeam DL. The CIPP model for evaluation. 2000; *Evaluation Models* Dordrecht: Springer.
15. Bozeman B, Feeney MK. Mentor matching: A "goodness of fit" model. *Administration & Society*. 2008; 40(5):465-482.
16. young Lee S, Shin J-S, Lee S-H. How to execute Context, Input, Process, and Product evaluation model in medical health education. *Journal of Educational Evaluation for Health Professions*. 2019; 16.
17. Kyngäs H. Inductive Content Analysis. In: Kyngäs H MK, Kääriäinen M, editor. *The application of content analysis in nursing science research*. Springer Nature; 2019; p. 13-21.
18. Blanco MA, Qualters DM. Mutual mentoring: Effect on faculty career achievements and experiences. *Med Teach*. 2020; 42(7):799-805.
19. Chen JJ, Kusner JJ, Saldaña F, Potter J. Development of a Novel Mentorship Platform to Foster Relational Mentoring, Empowered Vulnerability, and Professional Identity Formation in Undergraduate Medical Education. *Acad Med*. 2021; 96(11):1580-1585.
20. Guse J, Schweigert E, Kulms G, Heinen I, Martens C, Guse AH. Effects of Mentoring Speed Dating as an Innovative Matching Tool in Undergraduate Medical Education: A Mixed Methods Study. *PloS one*. 2016; 11(2):e0147444.

Appendix

a) Questionnaire

MIND workshop outlines

How to be a mentor

- I. Background work
 - Invite: fellows and faculty.
 - Format: virtual panel discussion.
 - Planning: Identify 2-3 senior faculty with mentorship experience to participate as panelists and provide them with questions ahead of time for the panel.
- II. Outline of workshop
 - Introduction to MIND, MIND leaders, events planned for the year.
 - Summary slides on what is a mentor, why mentorship is important especially for URIM physicians, and barriers to mentorship.
 - Poll Everywhere to solicit anonymous questions from participants for our panelists.
 - Discuss preplanned and audience questions.
 - End with post-event REDCap survey.

Meeting your MIND family

- I. Background work
 - Invite: medical students, residents, fellows, and faculty.
 - Format: virtual presentation with breakout rooms for family time.
- II. Outline of workshop
 - Welcome slide with information on how to rename yourself (including name, training level, specialty), ice breaker question to be answered in the chat/zoom poll.
 - Overview of MIND leadership team, mission statement, events planned for the year, expectations of participants.
 - Prior to breakout rooms, review ground rules.
 - Breakout rooms (~30 mins)
 - Participants are assigned to their MIND family breakout rooms.
 - In the breakout room: Introduce yourself, why you joined MIND, group ice breaker (ex. Play 7 degrees of separation), assign 1- or 2-point persons in charge of communicating with your MIND family and planning a social event.
 - Close breakout rooms. Have 2-3 groups share how the icebreaker went.
 - End with post-event REDCap survey (include link in chat and QR code on last slide).

Career Mentor Spotlight

- I. Background work
 - Invite: medical students and residents.
 - Format: virtual panel discussion.
 - Planning: Identify 2 senior faculty to spotlight and provide them with expected questions as panelists.
- II. Outline of workshop
 - Introduction of event and format.
 - Have 2 breakout rooms, each with one of our senior faculty members who will share their stories into medicine highlighting challenges overcome, non-traditional paths, and provide general advice. Leave time for questions from participants either by unmuting themselves, putting questions in the chat or using

anonymous submissions through Poll Everywhere.

- 20 minutes in each breakout room. Flip the senior faculty member to the opposite breakout rooms and repeat the session. This will ensure intimate setting for students/trainees to ask questions.
- Close breakout rooms and conclude session. End with post-event REDCap survey.

Microaggressions

- I. Background work
 - Invite: medical students, residents, fellows, and faculty.
 - Format: virtual presentation with breakout rooms for family time.
 - Planning: co-leaders research articles, movie/show/YouTube clips, podcasts relevant to the topic and create power point presentation.
- II. Outline of workshop
 - Welcome slide with information on how to rename yourself (include: name and family number) and participate in zoom poll ice breaker.
 - Review ground rules.
 - Play YouTube video: “How microaggressions are like mosquito bites” (<https://www.youtube.com/watch?v=hDd3bzA7450>).
 - Participants to submit one word reaction via Poll Everywhere (replies to be displayed on next slide). Have 1-2 participants expand on their answer to the whole group.
 - Review key definitions (microaggressions, microinsults, microinvalidations, microassaults) and slide on impact of microaggressions.
 - Breakout room (~25-30minutes)
 - Share the cases to discuss with family in breakout room and provide guiding discussion points.
 - Families also have option to discuss confidentially personal microaggressions experienced or witnessed.
 - Close breakout rooms and return as large group
 - 2-3 families share salient points from their family discussion.
 - Review common acronyms used to address microaggressions and tips for addressing these.
 - End with post-survey REDCap survey.

Imposter syndrome

- I. Background work
 - Invite: medical students, residents, fellows, and faculty.
 - Format: virtual presentation with breakout rooms for family time.
 - Planning: co-leaders research articles, movie/show/YouTube clips, podcasts relevant to the topic and power point presentation.
- II. Outline of workshop
 - Welcome slide with information on how to rename yourself (include: name and family number) and participate in zoom poll ice breaker.
 - Review ground rules.
 - Play YouTube video: “What is imposter syndrome and how can you combat it?” –

- Elizabeth Cox” (<https://youtu.be/ZQUxL4Jm1Lo>).
- Participants to submit anonymously one word reaction via Poll Everywhere (replies to be displayed on following slide).
- Breakout room (~30minutes)
 - Participants will take first 5 minutes to complete the Impostor Test (<https://paulinerooseclance.com/pdf/IPTestandscoring.pdf>) and self-score it.
 - Spend rest of time discussing the Impostor Test and/or other personal experiences related to the topic
- Close breakout rooms and return as large group
 - 2-3 families share salient points from their family discussion.
 - Review tips to overcome imposter syndrome.
 - End with post-event REDCap survey.

Book club

I. Background work

- Invite: medical students, residents, fellows, and faculty.

- Format: virtual book club.
- Planning: co-leaders will select book in advance and buy copies for members. For this book club we selected “Lead from the Outside” by Stacey Abrams. Provide copies of the book for participants.
 - i. Co-leaders prepare discussion guide with list of questions.

II. Outline of workshop

- Welcome slide with information on how to rename yourself (include: name and career level) and participate in zoom poll ice breaker.
- Review ground rules.
- Participants to share anonymously one or two words via Poll Everywhere describing their initial reaction to the book (replies to be displayed on following slide).
- Whole group discussion (~30minutes)
- MIND co-leaders discuss guide and engage participants with preprepared questions.
 - End with post-event REDCap survey.

b) Survey

MIND Survey:

MIND

Please complete the survey below. Your responses are being recorded for program evaluation and improvement purposes only. Your responses are anonymous and confidential: they will not be associated with your name or with a unique identifier.

Thank you!

- 1) How helpful was this session?

Very Unhelpful Neither helpful or unhelpful Very Helpful

=====

(Place a mark on the scale above)
- 2) How engaging were the activities?

Very Unengaging Neither Unengaging or Engaging Very Engaging

=====

(Place a mark on the scale above)
- 3) How can we improve this session?

- 4) What level in your career are you?
 - ☐ medical student
 - ☐ resident
 - ☐ fellow
 - ☐ attending
- 5) What MIND events have you attended this year (select all that apply):
 - ☐ How to be a mentor
 - ☐ Kickoff- family assignments
 - ☐ Mentor Spotlight
 - ☐ Microaggressions
 - ☐ None
- 6) Is there anything else you would like to share?

Climate Justice in the Barrios: A Chronically Neglected Topic for the Most Climate-Vulnerable Communities in the U.S.

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ABSTRACT

Climate justice is a critical concept that focuses on efforts addressing the disproportionate impacts of climate change on systematically disadvantaged populations. In this review, we provide an overview of current national climate justice topics important to the Hispanic community. Key aspects include disproportionate environmental burdens, vulnerability to extreme weather events, economic and labor inequalities, limited access to resources, engagement and representation, and the inequitable transition to a sustainable and low-carbon economy. Current US federal public legislation, policies and initiatives in the United States aimed at addressing climate justice in Hispanic communities are discussed. These policies serve as examples of efforts to address climate justice in the Hispanic community, but it is acknowledged that policies may have evolved since this publication.

The review seeks to highlight the need to further policies and best practices that specifically address unique challenges faced by Hispanic communities in relation to climate change. Recommendations include expanding climate justice initiatives, targeting clean energy infrastructure and investments in disproportionately affected communities, increasing community engagement and participation in decision-making processes as well as developing equitable climate adaptation and resilience strategies. In addition, funding allocation should be appropriate for short and long-term research and monitoring, promoting green workforce development and job opportunities, ensuring equitable access to clean energy, and enhancing climate education and awareness.

Overall, this review underscores the importance of incorporating climate justice principles into health care policies to achieve equitable and just outcomes that target Hispanic communities disproportionately affected by climate change.

Keywords: *Climate Justice, Air quality, Hispanic Health, Climate Change, Climate Justice policy, Built environment*

1. Introduction

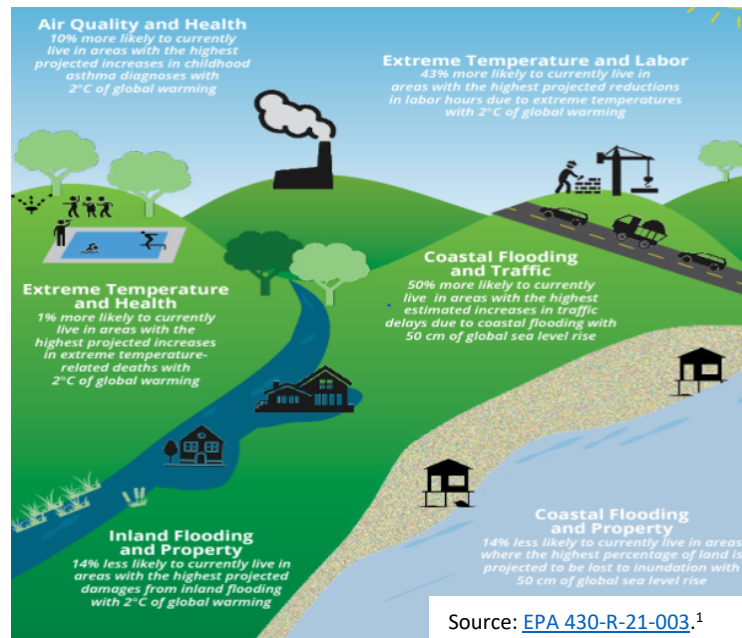
Climate justice is an important concept that addresses the disproportionate impacts of climate change on systematically disadvantaged populations¹ including Hispanic communities in the barrios (historically impoverished Spanish-speaking communities in U.S. urban areas)

Climate change refers to the long-term changes in the usual weather patterns of a given region, resulting in severe weather events that have become more frequent, more intense, and longer in duration.² Climate justice has been used to describe a wide range of legal and policy approaches to addressing climate change.

Over half of the United States Hispanic population resides in states with a high degree of climate change threats, such as air pollution, extreme heat, and flooding (Figure 1).³ In addition to lacking resources, Hispanic communities experience systematic exclusion from participating in decision-making processes that build climate resilience. Research indicates that Hispanics have heightened perceptions of vulnerability and support climate policy^{4,5} but lack inclusive opportunities

for collective action, advocacy, and education. For example, disproportionate burdens of air pollution can lead to adverse health outcomes across the age spectrum.⁶ Despite improvements in air quality over the past decades, important socioeconomic and racial disparities in air pollution exposure exist and poor air quality exposure is uneven across racial and ethnic groups.⁷

Figure 1. Disproportionate Risks of Climate Change to Hispanics



Particulate matter (PM) is a mixture of air pollutants originating directly or indirectly from sources that include traffic emissions, coal-fired power plants, oil and gas equipment, cars, trucks, poorly ventilated wood-burning stoves, and forest fires. It is classified according to its aerodynamic diameter size and is a common indicator of air pollution.⁸ Particulate matter refers to tiny airborne particles with those < 10 microns (PM₁₀) penetrating deep into the airways and particles ≤ 2.5 microns (PM_{2.5}) posing the greatest risk to health as they not only penetrate into the alveoli, but can be internalized into the airway epithelium and bloodstream. PM exposure can lead to cardiorespiratory disease, increase risks of neurologic conditions, and chronic kidney disease, and result in poor birth outcomes. Asian American, Pacific Islanders, Black non-Hispanic, and Hispanic individuals are more likely to reside in counties unable to meet the air quality standards for PM_{2.5} and ozone compared to non-Hispanic white individuals.⁹ Hispanics suffer high rates of chronic and developmental health conditions such as diabetes, heart disease, asthma, low birth weight, and prematurity that can be exacerbated by living in environmental justice areas with high levels of air pollution. In addition, lack of health care access, psychosocial stress, apprehension to access government services, and lack of culturally and linguistically competent health information can compound the health effects of air pollution.

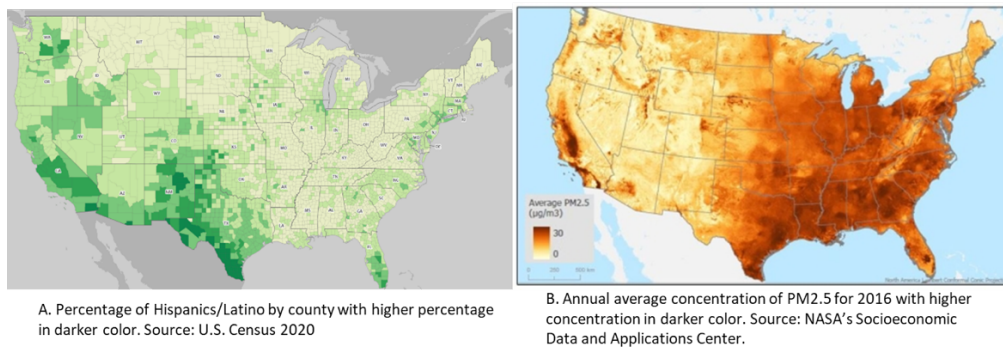
We aim to examine the intersectionality of climate justice in the Hispanic community to identify the unique challenges faced by the Hispanic population and the need for inclusive solutions. We also explore the role of policy and governance in addressing climate justice for Hispanics and best practices and strategies for achieving climate justice in this group.

Key aspects of climate justice in the Hispanic community

- a) Disproportionate air pollution burdens: Hispanic communities often bear the brunt of environmental burdens, such as exposure to air and water pollution, hazardous waste sites, and industrial facilities. The Clean Air Act passed in 1963, for example, requires the Environmental Protection Agency (EPA) to set and monitor National Ambient Air Quality Standards (NAAQS) for six common air pollutants including ozone and particulate matter known to contribute to adverse health effects.¹⁰ Although mean national levels of pollutants have fallen by 70% in the last decade,¹¹ there is still concern that ongoing current standards are too high to prevent serious health

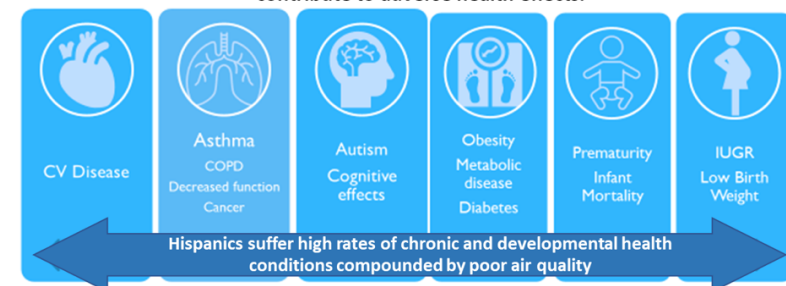
problems in portions of the population.¹² Particulate matter (PM) affects more people than any other pollutant and serves as common proxy for air pollution with PM_{2.5} posing the highest risk to adverse health effects. Poor air quality exposure is uneven across racial and ethnic groups including Hispanics.⁷ In fact, Asian American, Pacific Islanders, Black non-Hispanic, and Hispanic individuals are more likely to reside in counties unable to meet the air quality standards for PM_{2.5} and ozone compared to non-Hispanic white individuals.⁹ Figure 2. Redlining has been associated with disparities in intraurban air pollution against people of color including Hispanic and black populations.¹³

Figure 2. Latino communities are often located in areas with high concentrations of PM_{2.5}



Specific factors to Hispanic communities include lack to health care access, psychosocial stress, apprehension to access government services and lack of culturally and linguistically competent health information which compound the health effects of air pollution. These burdens contribute to adverse health outcomes and exacerbate existing disparities (Figure 3).

Figure 3. Air Pollutants including ozone and particulate matter contribute to adverse health effects.



- b) Vulnerability to extreme weather events: Hispanics are often disproportionately affected by extreme weather events like hurricanes, floods, and heatwaves.¹ Factors such as limited access to adequate housing, healthcare, and emergency services increase their vulnerability and hinder their ability to recover from climate-related disasters (Figure 1).
- c) Economic and labor inequalities: Many Hispanics work in industries that are highly exposed to climate risks, such as agriculture, construction, outdoor labor, and recreation. Climate change impacts, such as droughts, heat stress, and sea-level rise, can lead to job losses, reduced incomes, and economic instability within the community.
- d) Limited access to resources: Access to resources like clean air, clean water, and green spaces is crucial for a healthy and resilient community. The built environment is also important including access to outdoor spaces and activities in Hispanic communities that elevate the culture particularly during events of high air pollution.

However, some Hispanic communities face barriers to accessing these resources due to systemic factors such as racial segregation, discriminatory policies, and inadequate infrastructure. Namely, disparities in time spent outdoors, housing conditions and work environments lead to disproportionate exposure of air pollutants for certain racial and ethnic groups.

- e) Engagement, education, and representation: Ensuring the meaningful participation and representation of the Hispanic community in decision-making processes related to climate change is essential. This includes involving community members in developing climate policies, strategies, and adaptation plans, as well as creating platforms for their voices to be heard. In addition, impact can be amplified by increasing representation in government and leadership positions in committees that address climate change and air pollution.

Hispanics do not have equal access to information on climate change or resources for mitigation and protective measures. A large proportion of Hispanics support efforts promoting renewable energy, air pollution regulation and policies that broaden access to energy efficient vehicles and solar panels. Moreover, Hispanics consume products from companies with commitment to global warming reduction and are willing to vote for representatives with strong positions against climate change. However, fewer than half hear about global warming regularly in the media or get contacted by organizations working against climate change.^{4,5} Many consumers at high risk for detrimental health effects are frequently unaware or are unsure how to access publicly available educational tools that provide valuable information on environmental exposures including EPA's real time air quality database, AirNow.gov.¹⁴

- f) Just transition and sustainable development: Climate justice in the Hispanic community involves promoting a just transition to a sustainable and low-carbon economy. This includes providing training and job opportunities in renewable energy and other green sectors, as well as supporting community-led initiatives that promote sustainable development and resilience.

2. Current policies addressing climate justice in Hispanic communities in the US.

Heightened awareness of environmental disparities has led to federal and local legislation, policies and initiatives aimed to address climate justice in Hispanic communities. The following examples highlight governmental and community actions focusing on climate justice.

Federal Legislation addressing reduction and mitigation of air pollution

Three major pieces of legislation passed within the past two years make strides in addressing climate change. These legislative actions fund efforts to modernize air, rail, and vehicle public transportation with cleaner-fueled and greener vehicles to further reduce greenhouse gases and curtail or mitigate the effects of climate change. In addition, efforts at the local and state levels continue to gain momentum in moving forward the climate justice agenda. It's important to note that policies may have evolved, or new policies may have been implemented since this publication.

The American Rescue Plan (P.L. 117-2)¹⁵ expanded funding for clean mass transportation. More recently, billions of dollars were assigned to fund the Infrastructure Investment and Jobs Act Law (P.L.117-58)¹⁶ and the Inflation Reduction Act (P.L. 117-169).¹⁷ P.L.117-58 invests in correcting legacy pollution among communities of color. In addition, P.L. 117-58 in conjunction with P.L. 117-169, incentivizes building of a clean energy infrastructure, expanding electric vehicle networks, and reducing pollution at the nation's ports. These legislative actions aim to modernize air, rail, and vehicle public transportation with cleaner-fueled and greener vehicles to further reduce greenhouse gases to curtail and mitigate the effects of climate change.

Federal programs have tried to reduce or mitigate the effects of climate change and air pollution, but not all have been successful. The Clean Power Plan and Affordable Clean Energy initiative by President Obama's administration in 2015 and the less stringent Trump era Affordable Clean Energy Rule, provided air quality guidelines for existing power plants aimed to reduce carbon pollution as a transition from fossil fuel dependence. However, both measures were repealed by the courts.

Executive action on Environmental Justice and Air Quality

The Federal Interagency Committee on Indoor Air Quality established by Congress in 1983, coordinates federal efforts of multiple agencies on indoor air quality research and facilitates sharing of information from federal agencies to local governments, the research community, private sector, and the public.

In January 2021, President Joe Biden signed an executive order directing federal agencies to prioritize addressing environmental justice, which includes climate justice. This order aims to address the disproportionate impacts of pollution and climate change on the marginalized, including Hispanic communities, and promote equitable decision-making processes. The Justice 40 Initiative¹⁸ ensures that federal agencies deliver 40 percent of the overall benefits of climate, clean energy, affordable and sustainable housing, clean water, and other investments to disadvantaged communities. Covered programs would include those reducing local air pollutants, the effects of urban heat islands and transportation related emissions. Additional goals include improving indoor air quality and expanding availability and access to green housing.

The recent passing of the Inflation Reduction Act aims to improve affordability of energy efficient appliances and green construction by providing tax credits to families that would most benefit from tax relief. Other initiatives will in turn have a narrow focus on communities that are disproportionately affected by the effects of climate change including air pollution. An Environmental Justice Block Grants program plans to address pollution in coastal and port communities which are significantly affected by air pollutants. Several strategies target extreme heat exposure including tree planting projects sponsored by the USDA's Urban and Community Forestry Program and the US Department of Transportation's Neighborhood Access and Equity Grants.

The Department of Housing and Urban Development (HUD) Section 108 funds economic and physical development such as housing, public facilities, infrastructure, including improvements to increase resilience against natural disasters and climate change. From building of a flood protection wall featuring a riverwalk and community park in Mount Vernon, WA to supporting the creation of the largest urban production greenhouse of lettuce and greens in Cleveland, OH, federal HUD Section 108 funds offer the potential to mitigate climate change while addressing the needs of local communities. (reference: <https://www.hudexchange.info/programs/section-108/project-profiles/>)

Health and Human Services (HHS) agencies also offer a variety of programs directed at addressing the health effects of climate change. HHS programs could contribute to green construction and air pollution mitigation. Through the Federal Real Property Assistance Program, surplus property can be transferred to eligible organizations for public health and homeless assistance. Uses include homeless shelters, transitional and permanent housing. The CDC's Climate and Health Program developed the Building Resiliency Against Climate Effects Framework (BRACE) which provides guidance to local and state health officials for developing strategies directed to assist communities to prepare for the health effects of climate change. However, recent analysis of the BRACE tool identified gaps and nuances that limited its use. The program now aims to revise the framework including having public health departments create community partnerships with organizations who represent populations vulnerable to climate change.¹⁹ Although narrow in scope, current Medicare and Medicaid waivers for patients preferring home or community-based services can cover home cooling and air filtering devices. Starting in 2024, Oregon Medicaid plans to cover climate change related expenses including air conditioners and filters for members with certain health conditions that live in high-risk areas for extreme weather such as air pollution from wildfires and extreme heat.²⁰

Climate Action Plans and interventions at the State Level

Several states have developed climate action plans that explicitly address air pollution and improved air quality in the setting of climate justice and equity. For example, California's Climate Change Scoping Plan includes strategies to reduce greenhouse gas emissions and improve air quality in disadvantaged communities, which often includes significant Hispanic populations. New York's Climate Leadership and Community Protection Act aims to transition the state to a carbon-neutral economy while prioritizing investment and resources in disadvantaged communities, including Hispanic communities. Data from the Healthy Air, Healthy Schools Project at the University of Washington found that ultrafine air pollution particles from road and aircraft traffic infiltrate schools. Use of HEPA air purifiers significantly improved classroom air quality.²¹

Just Transition Programs

Just transition programs seek to support communities and workers affected by the transition to a low-carbon economy. Some states and cities have established programs to provide job training, economic development, and support for workers in industries affected by the shift away from fossil fuels. These programs often include a focus on communities of color, including Hispanic communities. Promise for green job opportunities comes from the National Institute of Environmental Health Sciences (NIEHS)'s Environmental Career Worker Training Program. Also, the Administration for Children & Families office's Community Service Block Grants fund comprehensive training to disadvantaged and underrepresented workers in areas such as environmental restoration, construction, hazardous materials/waste handling, and emergency response.

Climate and Environmental Justice Advisory Groups

Some states and local governments have established advisory groups or task forces to ensure that climate and environmental policies consider the needs and perspectives of communities most impacted by climate change. These groups often include representatives from diverse communities, including the Hispanic community, to provide input and guidance on policy decisions. Local, regional and organizations addressing climate change and air quality are leading reproducible innovative interventions to improve indoor air quality.

Community-Based Climate Resilience Initiatives

The recently created Office of Climate Change and Health Equity prioritizes the identification of vulnerable communities as well as private and non-profit sector partnerships to foster innovation in climate adaptation and resilience. Nonprofit organizations, community groups, and grassroots initiatives have emerged to address climate justice at the local level. These initiatives often focus on building community resilience, promoting renewable energy, improving air quality, and advocating for policy changes that benefit marginalized communities, including the Hispanic community. For example, the EPA Grants and Assistance Agreements initiative empowers communities by supporting a range of local and state partners that raise residents' awareness about air pollutants and climate stressors. In addition, the EPA now provides funding to local school districts to replace school buses with low or zero emission models through its Clean School Bus Program. Initial Clean School Bus awards in 2022 provided over \$900 million in rebates to replace nearly 2,500 buses to lower emission models.²²

3. Policy and Best Practices Recommendations

Identifying best practices and strategies for achieving climate justice in the Hispanic community: This objective involves synthesizing and analyzing successful strategies, programs, and policies that have been implemented to address climate justice in the Hispanic community. It aims to identify best practices that can guide future actions and interventions for achieving equitable and just outcomes.

- a) **Climate Justice Policies and Funding:** Governments should allocate sufficient funding to support climate justice initiatives that explicitly address the unique challenges faced by Hispanic communities in relation to climate change. This includes dedicated funding streams for community-led projects, capacity-building programs, and research efforts focused on addressing climate change impacts and promoting resilience. Policies should prioritize improvements that promote equitable access to clean air, water, and a healthy environment, while considering the social and economic factors that contribute to vulnerability. Hispanic
- b) **Increase Community Engagement and Participation:** Policymakers should ensure the meaningful participation and representation of Hispanic communities in climate-related decision-making processes. This can be achieved through community engagement initiatives, public consultations, and partnerships with community-based organizations. Providing language access at every level and structure of government is one crucial component for Hispanics to be included in decision-making processes. Meaningful engagement allows for the inclusion of diverse perspectives, knowledge, and needs in policy development and implementation. Policymakers and organizations should ensure that information, resources, and services related to climate change and climate justice are accessible and available in languages spoken by Hispanic communities. This includes providing language interpretation, translation services, and culturally appropriate materials to ensure effective communication and engagement.

- c) **Equitable Climate Adaptation and Resilience Strategies:** Climate adaptation and resilience plans should be developed with a focus on addressing the specific vulnerabilities of Hispanic communities. This includes investing in infrastructure improvements, ensuring access to reliable and affordable clean energy, enhancing disaster preparedness and response, and supporting the preservation of cultural heritage and community cohesion. Examples to consider include provision of assistance to and resettling of climate refugees and well as broadening Medicaid and Medicare waivers and coverage for mitigation strategies such as cooling and air filtration systems for high-risk patients (e.g., patients with cardiovascular and respiratory disease, pregnant women and children).
- d) **Green Workforce Development and Job Opportunities:** Policies should prioritize the creation of green jobs and provide training and education opportunities in renewable energy, energy efficiency, and other environmentally sustainable sectors. This supports economic empowerment and ensures that Hispanic communities can participate in and benefit from the transition to a low-carbon economy. Hispanic leaders should support legislation and policies that result in green job skills training including Hispanics and incentivize green businesses that will contribute to improvements in environmental quality and lead to a healthier Hispanic workforce.
- e) **Equitable Access to Clean Energy:** Policies should promote equitable access to clean and affordable energy, such as solar and wind power, in Hispanic communities. This can be achieved through programs that provide financial incentives, grants, or low-interest loans for the installation of renewable energy systems, particularly in low-income neighborhoods. Expansion of educational programs through the EPA Environmental Education Grants for communities and residents in environmental justice areas with large Hispanic populations exposed to poor air quality.
- f) **Climate Education and Awareness:** Governments, schools, and community organizations should prioritize climate education and awareness campaigns targeted at Hispanic communities. Culturally relevant education programs can empower community members with the knowledge and skills to understand climate change, its impacts, and solutions, fostering informed decision-making and action. Health related agencies should focus resources on addressing air pollution related health hazards in vulnerable populations such as Hispanics. Widespread use of social and broadcast media can be used to educate Hispanics on air pollution related health risks and resources like Air Quality Index (AQI) to identify hazards and reduce exposures.
- g) **Collaborative Partnerships:** Policymakers should foster partnerships between government agencies, nonprofit and community-based organizations and academic institutions to jointly address, research and find solutions to climate justice in Hispanic communities. Collaboration enhances the effectiveness of initiatives, enables resource sharing, and promotes the exchange of best practices and lessons learned.
- h) **Data Collection and Disaggregation:** Governments and research institutions should collect and analyze climate and environmental data specifically related to Hispanic communities. This disaggregated data helps identify disparities, understand the unique challenges faced by Hispanics, and guide evidence-based policy-making and targeted interventions.

Conclusion

To address climate justice in the Hispanic community, it is important to consider intersectionality and work towards public policy solutions that address both climate change and the underlying social, economic, and political factors that contribute to inequality. This can be achieved through policy changes, community organizing, education, advocacy, and collaboration with diverse stakeholders.

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References

1. EPA. 2021. Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts. U.S. Environmental Protection Agency, EPA 430-R-21-003.
2. EPA. Climate Change. 2023; <https://www.epa.gov/climate-change>, 04/14/2023.
3. Quintero A, Constible J. Nuestro futuro: Climate change and US Latinos. Natural Resources Defense Council. October 13, 2016. Accessed November 28, 2022. <https://www.nrdc.org/sites/default/files/nuestro-futuro-climate-change-latinos-report.pdf>.
4. Leiserowitz, A., Cutler, M., and Rosenthal, S. (2017). Climate Change in the Latino Mind. Yale University. New Haven, CT: Yale Program on Climate Change Communication.
5. Akerlof, K. L., Delamater, P. L., Boules, C. R., Upperman, C. R., and Mitchell, C. S. (2015). Vulnerable populations perceive their health as at risk from climate change. *Int. J. Environ. Res. Pu.* 12, 15419–15433. doi: 10.3390/ijerph121214994.
6. Thurston GD, Kipen H, Annesi-Maesano I, et al. A joint ERS/ATS policy statement: what constitutes an adverse health effect of air pollution? An analytical framework. *European Respiratory Journal*. 2017;49(1):1600419.
7. Brumberg HL, Karr CJ. Ambient Air Pollution: Health Hazards to Children. *Pediatrics*. 2021;147(6).
8. World Health Organization. Ambient (outdoor) air pollution. December 19, 2022. Accessed September 20, 2023. [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health#:~:text=Pollutants&text=PM%20is%20a%20common%20proxy,carbon%2C%20mineral%20dust%20and%20water](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health#:~:text=Pollutants&text=PM%20is%20a%20common%20proxy,carbon%2C%20mineral%20dust%20and%20water).
9. Mortimer, K.M., Tager, I.B., Dockery, D.W. Neas, L.M., Redline S. 2000. The effect of ozone on inner city children with asthma. Identification of susceptible subgroups. *American Journal of Respiratory and Critical Care Medicine*, vol. 162, page 1843.
10. Criteria Air Pollutants. United States Environmental Protection Agency. Accessed 12/9/22 <https://www.epa.gov/criteria-air-pollutants>.
11. Air Quality - National Summary. United States Environmental Protection Agency. Accessed 12/9/22. <https://www.epa.gov/air-trends/air-quality-national-summary>.
12. Cromar KR, Lee AG, Harkema JR, Annesi-Maesano I. Science-based Policy Recommendations for Fine Particulate Matter in the United States. *American journal of respiratory and critical care medicine*. 2022;206(9):1067-1069.
13. Lane HM, Morello-Frosch R, Marshall JD, Apte JS. Historical Redlining Is Associated with Present-Day Air Pollution Disparities in U.S. Cities. *Environmental science & technology letters*. 2022;9(4):345-350.
14. Damon SA, Rupert DJ, Pryzby R. Air Aware: Improving Use of an Existing Air Quality and Health Tool. *Journal of health communication*. 2022;27(1):1-7.
15. Text – H.R. 1319 – 117th congress (2021-22): American Rescue Plan Act of 2021 (2021, March 11). <https://www.congress.gov/bill/117th-congress/house-bill/1319/text>.
16. Text – H.R. 3684 – 117th congress (2021-22): Infrastructure Investment and Jobs Act (2021, November 15). <https://www.congress.gov/bill/117th-congress/house-bill/3684/text>.
17. Text - H.R.5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022. (2022, August 16). <https://www.congress.gov/bill/117th-congress/house-bill/5376/text>.
18. Justice 40. Environmental Initiative. The White House. Accessed 12/9/22. <https://www.whitehouse.gov/environmentaljustice/justice40/>.
19. Lemon SC, Joseph HA, Williams S, Brown C, Aytur S, Catalano K, Chacker S, Goins KV, Rudolph L, Whitehead S, et al. Reimagining the Role of Health Departments and Their Partners in Addressing Climate Change: Revising the Building Resilience against Climate Effects (BRACE) Framework. *International Journal of Environmental Research and Public Health*. 2023; 20(15):6447. <https://doi.org/10.3390/ijerph20156447>.
20. The Oregon Health Authority. Climate and Health in Oregon 2021–2022 Report. Accessed September 20, 2023. https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/CLIMATECHANGE/Documents/le-105251_23.pdf.
21. Healthy Air, Healthy Schools Study: Phase 1 Report, University of Washington, School of Public Health, December 2021.
22. EPA. Awarded Clean School Bus Program Rebates. Last updated August 31, 2023. Accessed September 20, 2023. <https://www.epa.gov/cleanschoolbus/awarded-clean-school-bus-program-rebates>.



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