

The Association Between Work Situation and Stress Levels for individuals aged 30-45 in Brooklyn, NY

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INTRODUCTION

Work-related stress is a pervasive issue that significantly impacts employees across various industries, leading to adverse health outcomes, decreased job satisfaction, and higher turnover rates. The work situation, which encompasses the physical environment, job demands, social interactions, and organizational culture, plays a critical role in shaping stress levels among workers. Previous research has demonstrated that supportive and flexible work environments can mitigate stress, whereas adverse work situations characterized by high demands and low control can exacerbate it (Karasek, 1979; Golden, 2008; Zhang et al., 2023).

Despite the substantial body of literature on work-related stress, there remains a need for focused research on specific populations and age groups to better understand how work situations impact stress levels. This study aims to address this gap by investigating the relationship between different work situations and stress levels among working adults aged 30-45. By using the PRAPARE survey, which is a validated tool for assessing social determinants of health, including employment status and job stability, this study seeks to provide meaningful insights into the effects of job choice and work situation on stress levels.

It is hypothesized that adverse work situations, such as unemployment or part-time work, will be associated with higher stress levels compared to full-time work, which is presumed to offer more stability and resources.

METHODS

- For this quantitative study, we looked at data from a PRAPARE survey that was administered to 236 people ranging in age from 12-82.
- Of these 236 people, we included data only from participants aged 30-45. This age range was chosen because it represents a group of people who are likely to have a balance of stability and maturity when dealing with stress factors. Analyzing this specific age group allowed our study to avoid the unique stressors of younger and older people and focus primarily on how different work situations impact stress levels.
- The PRAPARE survey itself, featured questions such as “How stressed are you? (Not at all, A little bit, Somewhat, Quite a bit, and Very much)” and “What is your current work situation? (Full-time work, Part-time work, Student, and Unemployed).”
- The association between work situations (main predictor) and stress levels (main outcome) were analyzed in SPSS using Chi-square and Fisher exact tests.
- Furthermore, we performed a stratified analysis in SPSS, which accounts for the potential role of gender within our association between stress and work situations.

MATERIALS

- PRAPARE** – a tool consisting of 20 questions developed by several institutes to create a standardized screener for community health centers (Laforge et al., 2018)
- RedCap** – a database to manage online surveys
- IBM SPSS** – a software for statistical computation

Figure 1: Study Demographics

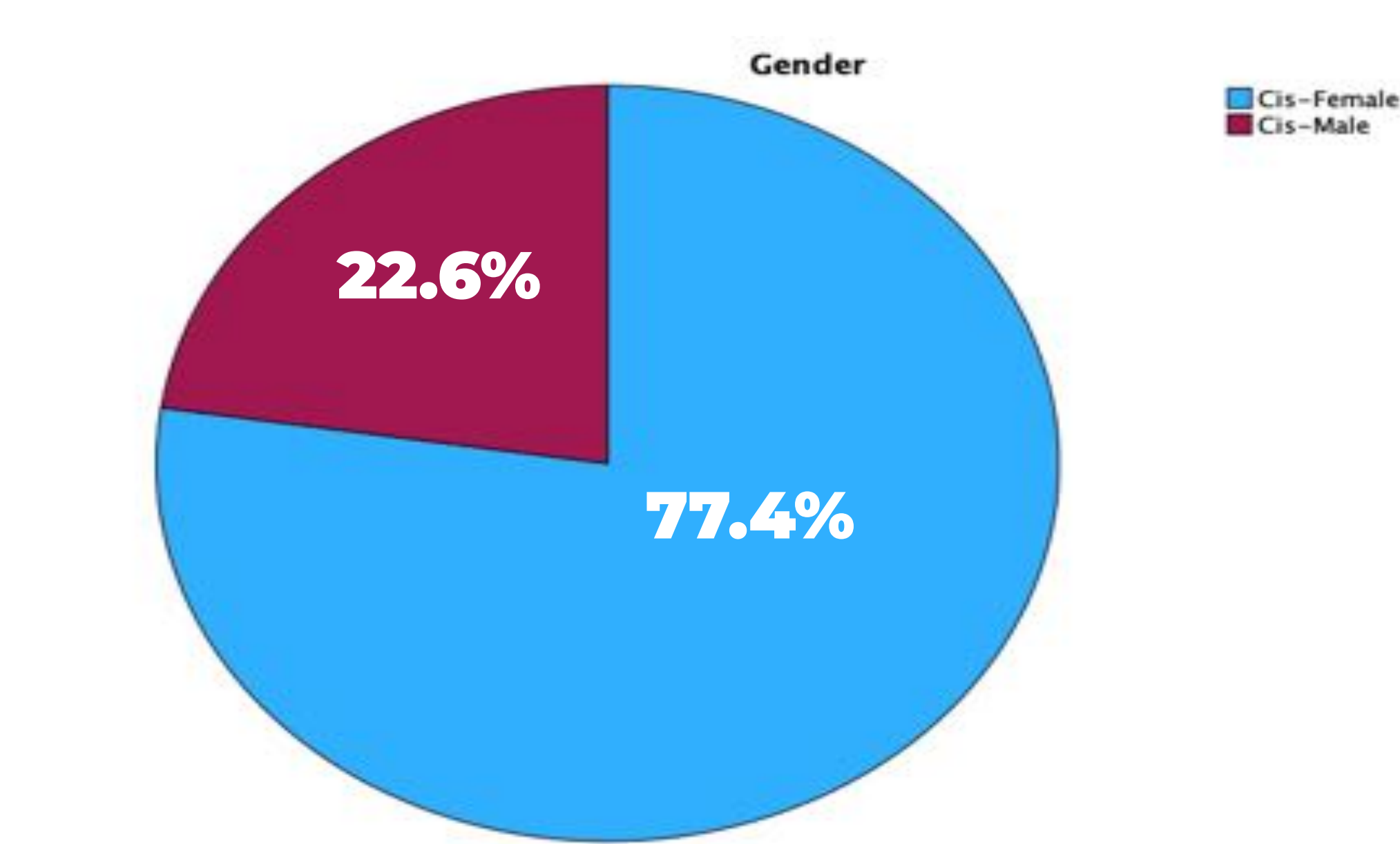
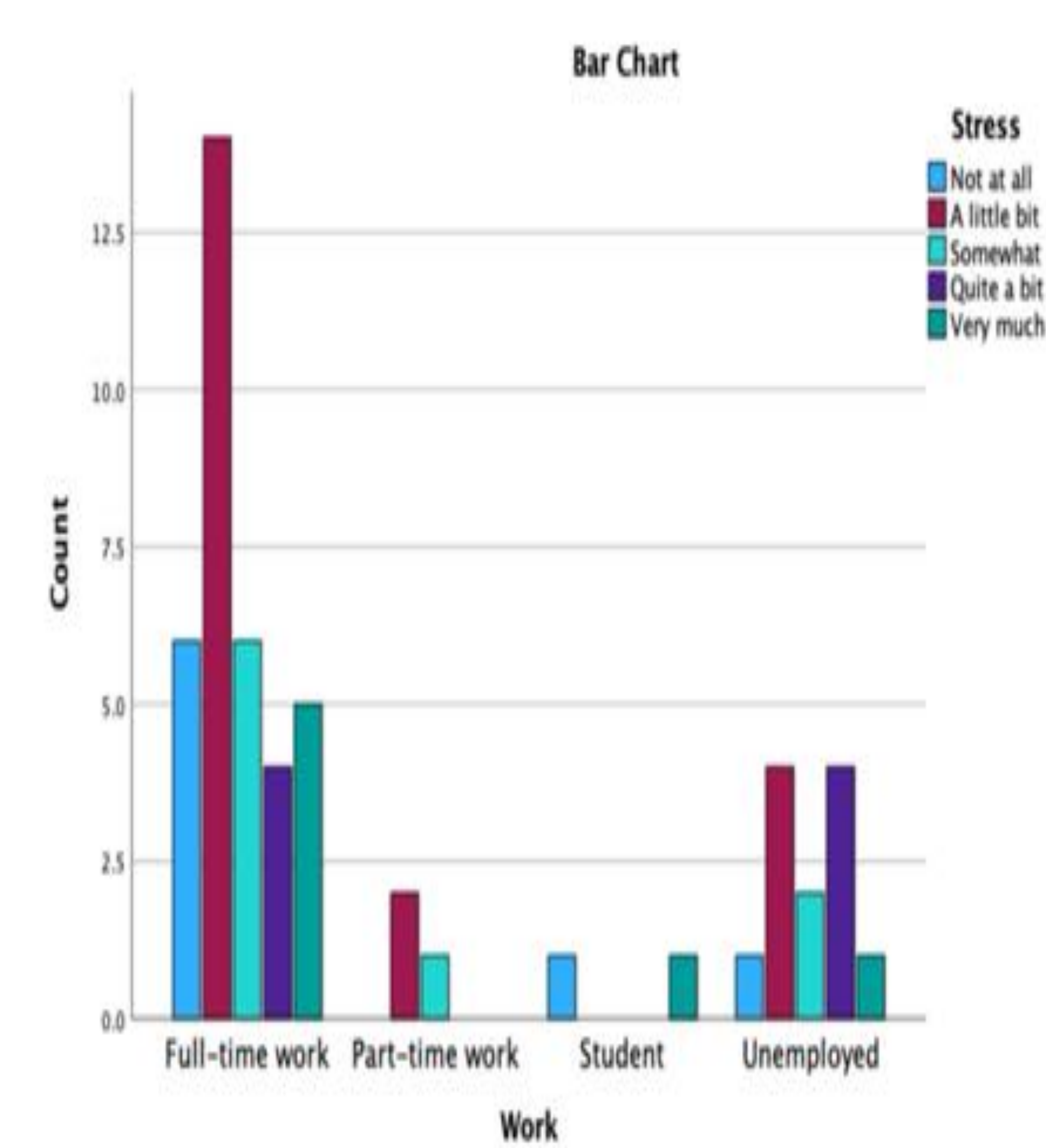


Figure 2: Relationship between Work situation and Stress levels



RESULTS

- Our study had 52 responses with 41 of them coming from women (77.4%), and 11 of them coming from men (22.6%). (figure 1)
- Of these 52 individuals, 35 worked full-time, 3 worked part-time, 2 were students, and 12 were unemployed. (table 1)
- 8 of our participants reported to be not stressed at all. 20 reported being a little bit stressed. 9 reported being somewhat stressed. 6 reported having quite a bit of stress, and 7 reported being very much stressed. (table 1)
- Our Pearson Chi-Square test recorded a p-value of .525 and our Fisher Exact test recorded a p-value of .607. Both p-values are insignificant.
- Our stratified analysis which took gender into account continued to show no association between work situation and stress levels (female p-value = .453, male p-value = .202).

Table 1: Work situation and Stress level results

		Stress					Total
		Not at all	A little bit	Somewhat	Quite a bit	Very much	
Full-time work	Count	6	14	6	4	5	35
	% within Work	17.1%	40.0%	17.1%	11.4%	14.3%	100.0%
	% within Stress	75.0%	70.0%	66.7%	50.0%	71.4%	67.3%
Part-time work	Count	0	2	1	0	0	3
	% within Work	0.0%	66.7%	33.3%	0.0%	0.0%	100.0%
	% within Stress	0.0%	10.0%	11.1%	0.0%	0.0%	5.8%
Student	Count	1	0	0	0	1	2
	% within Work	50.0%	0.0%	0.0%	0.0%	50.0%	100.0%
	% within Stress	12.5%	0.0%	0.0%	0.0%	14.3%	3.8%
Unemployed	Count	1	4	2	4	1	12
	% within Work	8.3%	33.3%	16.7%	33.3%	8.3%	100.0%
	% within Stress	12.5%	20.0%	22.2%	50.0%	14.3%	23.1%
Total	Count	8	20	9	8	7	52
	% within Work	15.4%	38.5%	17.3%	15.4%	13.5%	100.0%
	% within Stress	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

CONCLUSION

- In this study, no significant association could be found between work situation and stress. This conclusion was due to a number of limitations.
- Those limitations include a small sample size, as well as the data being collected during the peak of the Covid pandemic.
- More significant results could be produced by using a larger sample size of people of the same age range (within 15 years), who are actively working without outside impediment.
- The findings of this study will have implications for employers, healthcare providers, and policymakers in creating supportive work environments that promote mental health and productivity.

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Pilot Study: A Systematic Literature Review of the Leadership and Legacy of Foreign-Trained Women of Color in New York’s Healthcare: Contributions, Challenges, and Impact

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SUNY Downstate Office of Diversity Education and Research



Introduction

Foreign-trained women of color, recruited to address staffing shortages, played a crucial role in the historical sustainability of the New York State (NYS) healthcare system. Using a systematic literature review, this study aims to understand how the experiences, leadership roles, and enduring legacy of these women can enhance diversity, quality of care, and accessibility for NYS communities. By unveiling the experiences of these hidden figures, we can advocate for efforts that promote diversity, gender equity, and inclusion in contemporary healthcare.

Objectives

- This pilot study examines the contributions of foreign-trained women of color to the New York State healthcare system, focusing on their impact on healthcare practices, policies, and patient outcomes. It also explores the challenges faced by these women, such as immigration, sexism, racism, and institutional barriers.
- The findings aim to provide practical insights into creating an equitable system for future generations of healthcare workers .

Methods

- Comprehensive search of the literature across multiple databases including PubMed, Scopus, JSTOR, and Web of Science. The search terms included "systematic review," "foreign-trained," "women of color," "community practice," and "health interventions." The search was limited to articles published between January 2010 and April 2023.
- Inclusion Criteria: Studies published in peer-reviewed journals that reported quantitative or qualitative outcomes of community practice interventions and were available in English.
- Exclusion Criteria: Studies without clear intervention descriptions, review articles, and conference abstracts.
- Reviewers independently screened titles and abstracts for relevance, retrieved and assessed the full texts of potentially relevant articles. Data on study characteristics, intervention specifics, sample size, and key outcomes was analyzed using an Excel spreadsheet.

Results

Table 1: Frequently Reported Obstacles for Foreign-Women of Color in Healthcare

Obstacle	Authors	Type of Source
Education Requirements	Mick (1975)	Journal Article
Education Requirements	Wojczewski S, Pentz S, Blacklock C, Hoffmann K, Peersman W, Nkomazana O, et al. (2015)	Qualitative Research
Education Requirements	Primeau, M. D., Champagne, F., & Lavoie-Tremblay, M. (2014)	Journal Article
Education Requirements	Al Achkar, M., Dahal, A., Frogner, B.K. et al. (2023)	Qualitative Research
Education Requirements	Stevens, R. A., Goodman, L. W., & Mick, S. S. (1974)	Qualitative Research
Language Barriers	Mick (1975)	Journal Article
Language Barriers	Wojczewski S, Pentz S, Blacklock C, Hoffmann K, Peersman W, Nkomazana O, et al. (2015)	Qualitative Research
Language Barriers	Primeau, M. D., Champagne, F., & Lavoie-Tremblay, M. (2014)	Journal Article
Language Barriers	Al Achkar, M., Dahal, A., Frogner, B.K. et al. (2023)	Qualitative Research
Language Barriers	Stevens, R. A., Goodman, L. W., & Mick, S. S. (1974)	Qualitative Research
Cultural Barriers	Mick (1975)	Journal Article
Cultural Barriers	Wojczewski S, Pentz S, Blacklock C, Hoffmann K, Peersman W, Nkomazana O, et al. (2015)	Qualitative Research
Cultural Barriers	Primeau, M. D., Champagne, F., & Lavoie-Tremblay, M. (2014)	Journal Article
Cultural Barriers	Stevens, R. A., Goodman, L. W., & Mick, S. S. (1974)	Qualitative Research
Underrepresentation in Leadership Positions	Bowman M, Gross ML (1986)	Journal Article
Underrepresentation in Leadership Positions	Okoro O, Umaru O, Ray M (2024)	Journal Article
Discrimination	Wojczewski S, Pentz S, Blacklock C, Hoffmann K, Peersman W, Nkomazana O, et al. (2015)	Qualitative Research
Discrimination (Xenophobia)	Primeau, M. D., Champagne, F., & Lavoie-Tremblay, M. (2014)	Journal Article
Discrimination (Xenophobia)	Al Achkar, M., Dahal, A., Frogner, B.K. et al. (2023)	Qualitative Research
Discrimination	Stevens, R. A., Goodman, L. W., & Mick, S. S. (1974)	Qualitative Research
Discrimination (Sexism)	Bowman M, Gross ML (1986)	Journal Article
Discrimination (Racism)	Okoro O, Umaru O, Ray M (2024)	Journal Article
Technological Differences	Primeau, M. D., Champagne, F., & Lavoie-Tremblay, M. (2014)	Journal Article
Difficulty Networking	Al Achkar, M., Dahal, A., Frogner, B.K. et al. (2023)	Qualitative Research
Difficulty Networking	Okoro O, Umaru O, Ray M (2024)	Journal Article
Income Inequality	Bowman M, Gross ML (1986)	Journal Article
Income Inequality	Okoro O, Umaru O, Ray M (2024)	Journal Article

Table 1 demonstrates the eight most frequently reported obstacles for foreign-trained women of color. The highest reported obstacle is discrimination. Six out of eight articles describe the different types of discrimination foreign-trained women may face while working in the NYS healthcare sector. Education requirements and language barriers also prove to be a major adversity to the success of foreign-trained women of color in healthcare, with five out eight articles referring to these two obstacles. Difficulty adjusting to different technology is the least cited obstacle with one article referencing it.

Figure 1: Tree Map of the Challenges, Contributions, and Impact of Foreign-Trained Women of Color in the NYS Healthcare Sector

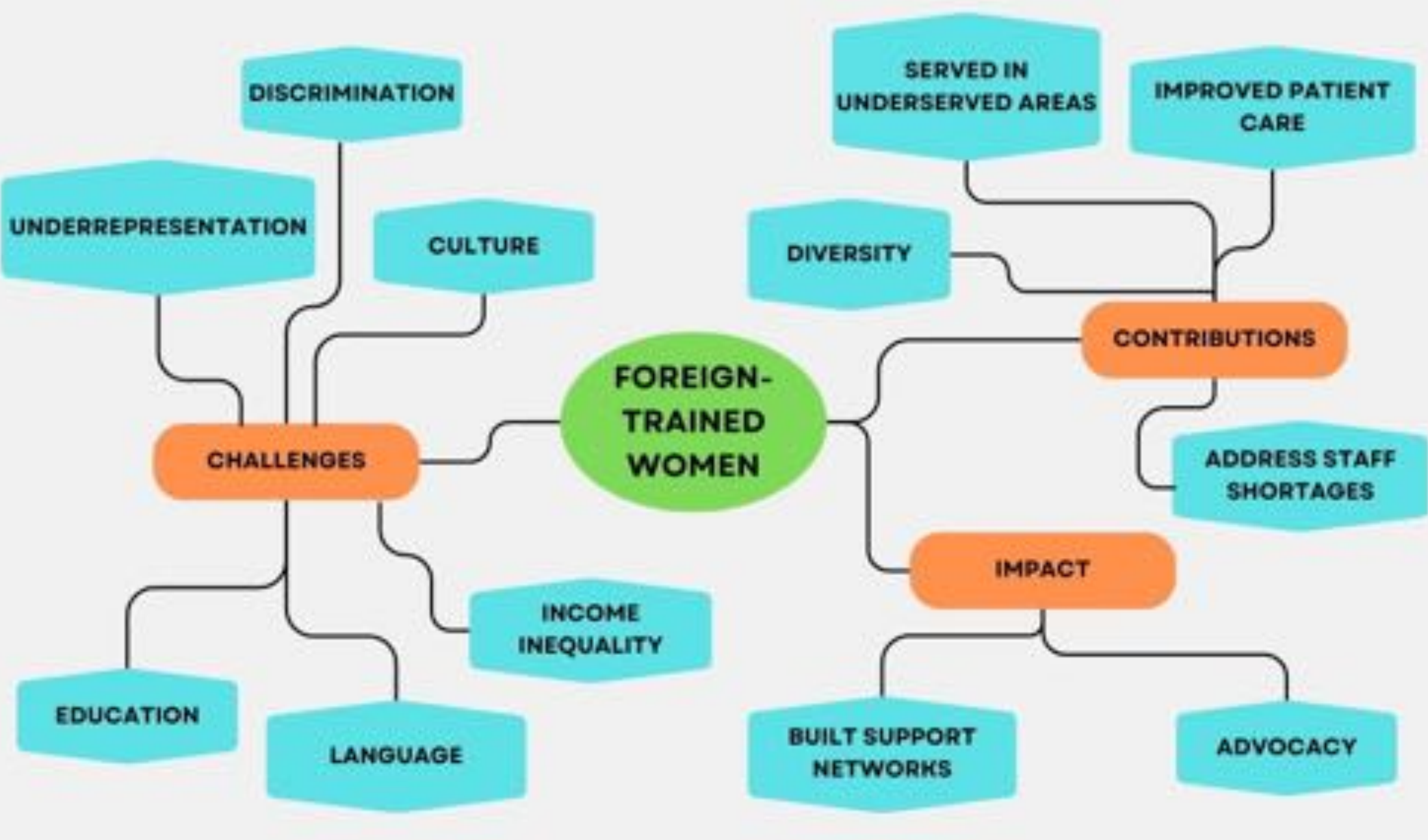


Figure 1 illustrates that diversity is the most referenced contribution as half of the articles mention the diverse perspectives that foreign-trained women bring. Another significant contribution is that foreign-trained women usually work in underserved communities. Two of the articles mention that these individuals prefer working in urban hospital settings rather than a private practice. The advocacy of these women is also often cited in the literature. Three out of the eight articles describe how their advocacy for equitable health policies shaped the future of healthcare.

Discussion

The systematic literature review revealed that there is a demand for community-based health interventions to help integrate foreign-trained healthcare professionals. These studies underscore the importance of these interventions in improving health metrics, especially in underserved communities. For instance, Kaushal (2015) details foreign-trained nurses' challenges and successes, while other BioMed Central studies demonstrate the positive impact of diverse healthcare teams on patient care quality and accessibility. When compared with previous research, our findings align with the literature supporting the efficacy of these interventions. Several limitations including a limited amount of existing literature, a lack of variability in study designs, and the lack of long-term outcome data. These limitations highlight the need for future research that focuses on uncovering the narratives of underrepresented populations, employing diverse methodologies, and the significance of intersectionality. Exploring the integration of foreign-trained healthcare professionals in various contexts can help identify equitable practices and inform policy development.

Conclusion

The research highlighted the crucial role of foreign-trained healthcare professionals in improving health outcomes and addressing workforce shortages. These interventions are effective in enhancing health metrics, particularly in underserved areas. The broader implications of our findings suggest that strategic community practice interventions and the integration of foreign-trained professionals are vital for enhancing healthcare delivery. Future research should prioritize underrepresented populations, employ diverse methodologies, and consider additional variables to strengthen the evidence base. Additionally, exploring the integration of foreign-trained professionals in different healthcare contexts can further inform best practices and policy development, ensuring healthcare systems can effectively meet the needs of diverse populations.

Acknowledgements

Marco Stillo, MPH, MSBME
Jasmin Thomas , OTD, OTR/L, BCP

References

Located in Table 1

The Aftermath: Food Insecurity and Zip Codes in Post-Pandemic Brooklyn, New York

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INTRODUCTION

- **Food insecurity:** The state of having insufficient quantity and/or lack of quality nutritious foods in one's diet, to the point where it fails to meet one's basic needs.
 - Sameena Azhar defines food insecurity as extending to psychosocial stress on individuals and families, who worry about having enough money to get their next meal (Azhar 2023).
- Food insecurity is often caused by many factors, such as poverty, unemployment, and consequences related to preexisting health conditions.
- Studies claim that food insecurity rates were affected by the COVID-19 pandemic
 - Worldwide, around 660 million people may still be battling hunger and food insecurity in 2030, partly due to the lasting effects of the COVID-19 pandemic.
 - National estimates of food insecurity in the United States doubled to 38%, with U.S. households with children facing food insecurity rates at double to triple the numbers seen before the pandemic (Azhar 2023).
 - Data obtained by nyc.gov found that 70 % of New Yorkers saw an increase in food prices between April and October 2020, whereas 20% of New Yorkers did not have enough funds to afford groceries in that period (nyc.gov, 2021).
- **Zip Code:** Five-digit numbers that partition geographical areas of the United States, in order to make mailing more efficient.
- In past research, zip codes have been used to represent socioeconomic statuses.
 - Qifang Bi researched the correlation between drinking, nutrition, & HIV testing vs. zip codes in NYC, with the intent to create tailored intervention messages to each zip code.
- Participants are mostly well-aware of their area's zip code, making data collection easier and more organized (Bi 2020).
- The association between food insecurity and zip code in New York City was prominent during the COVID-19 pandemic, with focus on the lasting effect these lifestyle inequities within each region would have on food insecurity. However, a paucity of wide-ranging data made it difficult to definitively link these variables together.
- Our study aims to investigate the possible variability in food insecurity across different locations. We will look at the correlation between food insecurity and zip code in a post-pandemic Brooklyn, as well as look at the access to food pantries in each zip code.

METHODS

Data Source
Our population consisted of outpatient adults (>18 y/o) who utilized one of 5 family medicine clinics of University Hospital of Brooklyn-Downstate from 2020-2024. Our study only included patients who live within a Brooklyn-based zip codes (i.e. 112__). We administered a version of the PRAPARE survey (**Protocol for Responding to and Assessing Patients' Assets, Risks and Experiences**), which is a validated risk assessment tool designed to evaluate & address a patient's social determinants of health (SDOH); all surveys were administered remotely using Doximity dialer & recorded on RedCAP.

Data Definitions
Main Outcome - Food insecurity

Participants were asked if they had difficulty paying for food or groceries in the last 6 months (answers were formatted in the "Yes or no" style)

Main predictor - Zip Code

Zip codes were acquired via the survey and verified via University Hospital's EMR. Zip codes containing zero patients were excluded (shown in grey in Figures 1&3) Other covariates of interest: These covariates were chosen because they could offer further insight into our main association of interest.

Food pantries: The number of food pantries is of high importance because it gives us an insight into which zip codes have food security and which do not. We evaluated the number of food pantries within 1 miles of each zip code using data from the HiteSite.org webpage
Education: Participants were asked "What is your highest level of education?" within the survey; responses were collapsed into 3 levels: less than junior high (<6th grade), junior high through high school diploma (6-12th grade), & greater than high school.

Statistical Analysis
All analyses were performed in SPSS. Basic descriptive analyses were performed, evaluating food insecurity, no# of food pantries, & educational level across each Brooklyn zip code. Higher level analyses were performed across all zip codes, using Fisher's exact test & logistic regression.

Figure 1: Percentage Food Insecure in Each Zip Code (n=352)

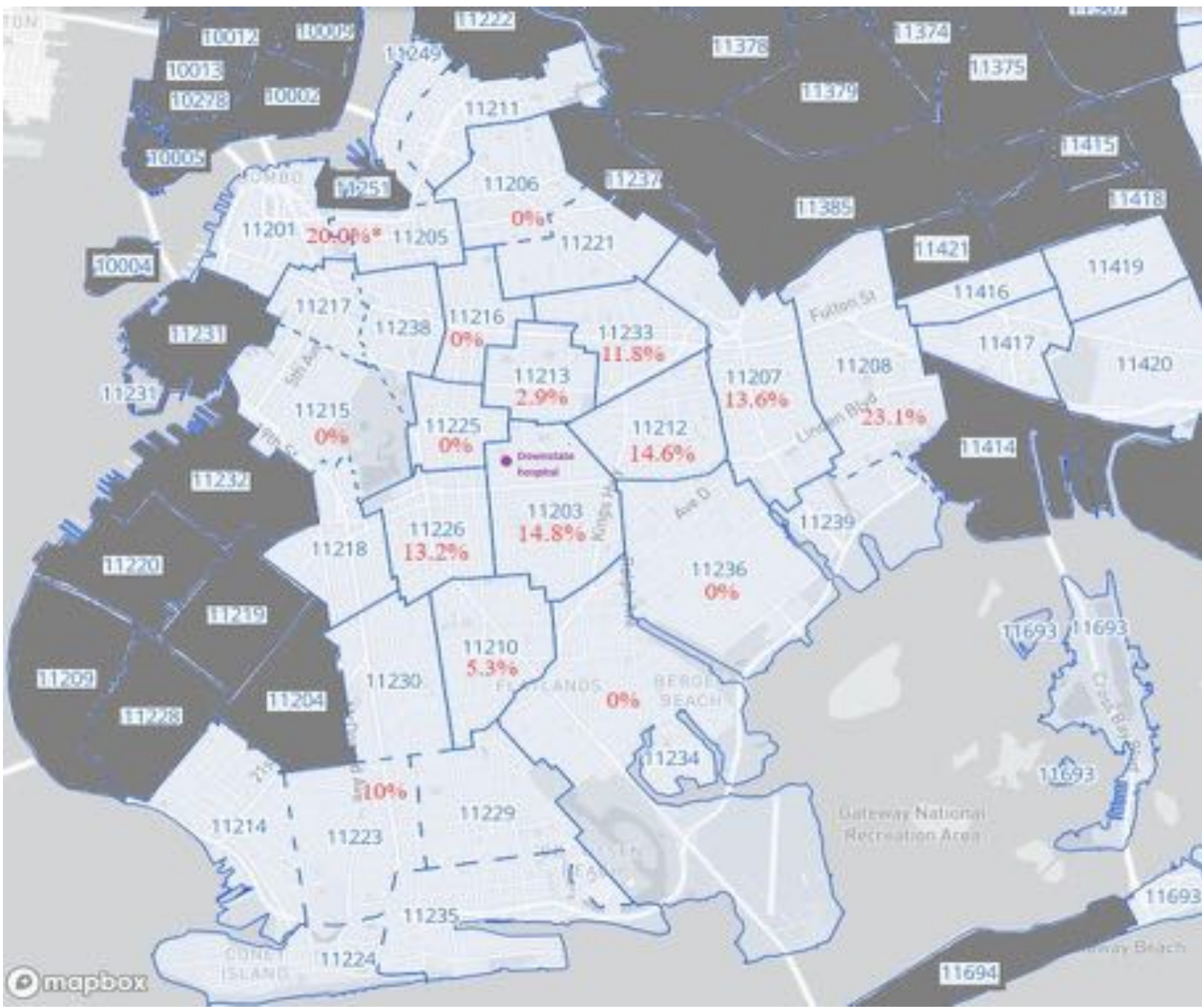
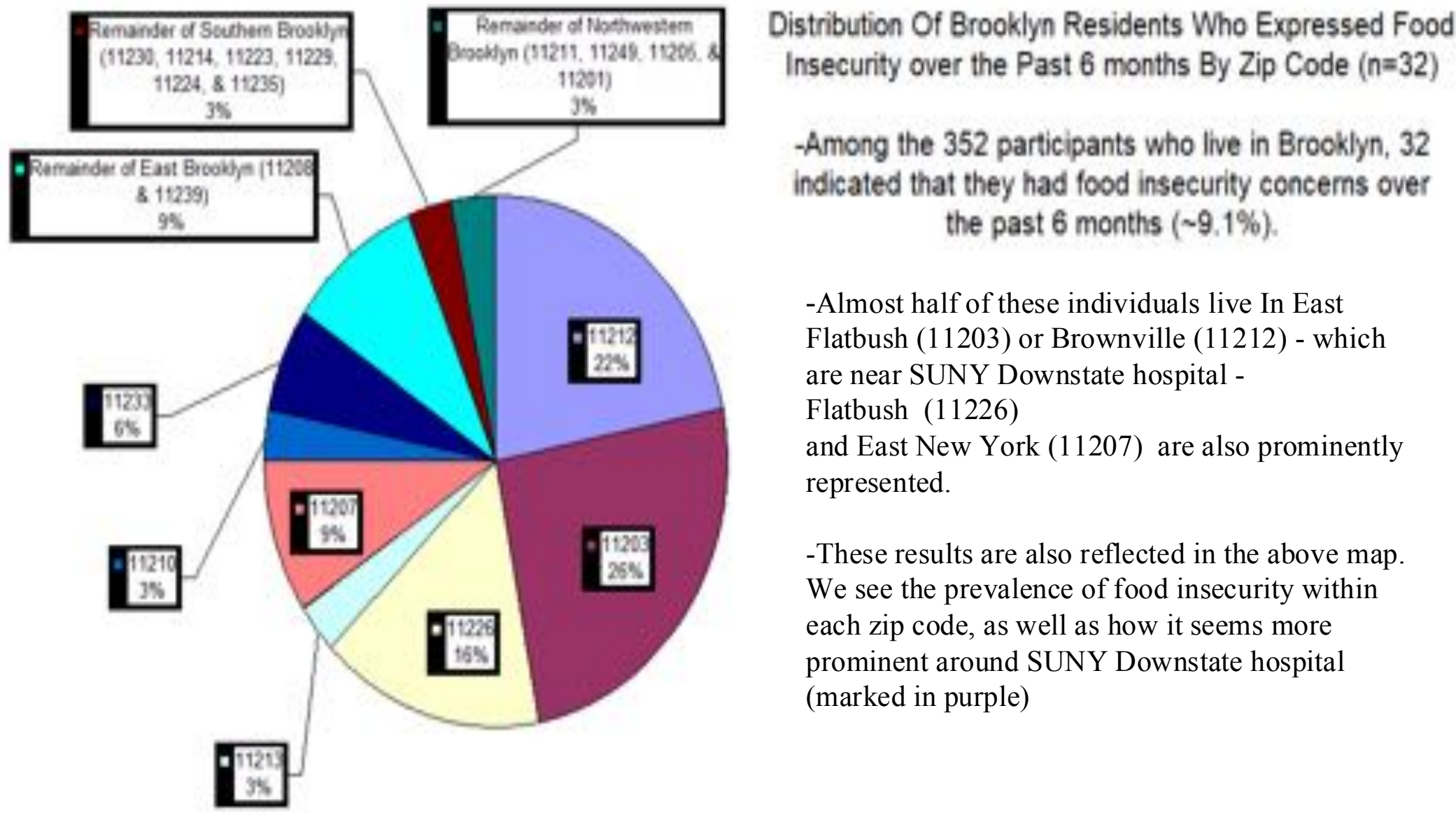


Figure 2: Brooklyn Residents Expressing Food Insecurity over Past 6 months By Zip



RESULTS

- Our sample is composed of 352 adult clinic patients out of SUNY Downstate hospital who came from various neighborhoods across Brooklyn (28 zip codes in total).
- Four zip codes (11212, 11203, 11226, 11213) accounts for 50% of our sample (11212 & 11203 each contributing 13.1%), while 11225, 11207, 11210, 11234, 11233, 11236 each contribute 4-8%.
- There was a paucity of data for many other Brooklyn zip codes; because of this, we decided to combine these sparse zip codes into larger regions, based on geographical proximity. These include:
 - Northeastern Brooklyn: 11221, 11206
 - Northwestern Brooklyn: 11211, 11249, 11205, 11201
 - Eastern Brooklyn: 11208, 11239
 - Western Brooklyn: 11217, 11238, 11215, 11218
 - Southern Brooklyn: 11230, 11214, 11223, 11229, 11224, 11235
- Figure 1 maps out the prevalence of food insecurity present in each zip code, while Figure 2 looks specifically at how the food insecure participants are distributed (descriptions provided)

Figure 3: The Availability of Food Pantries Within One Mile of Each Zip Codes (n=144 total pantries)

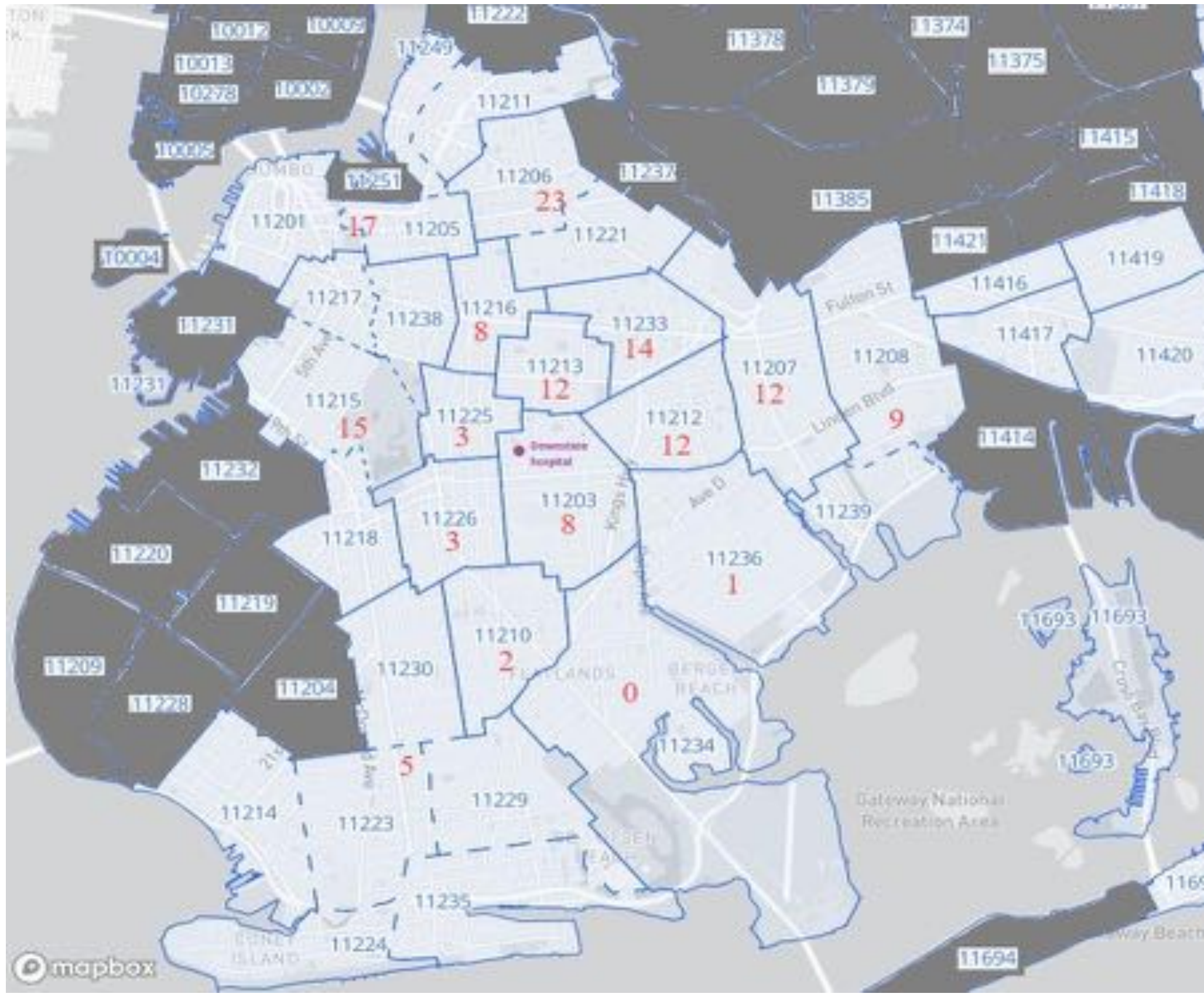
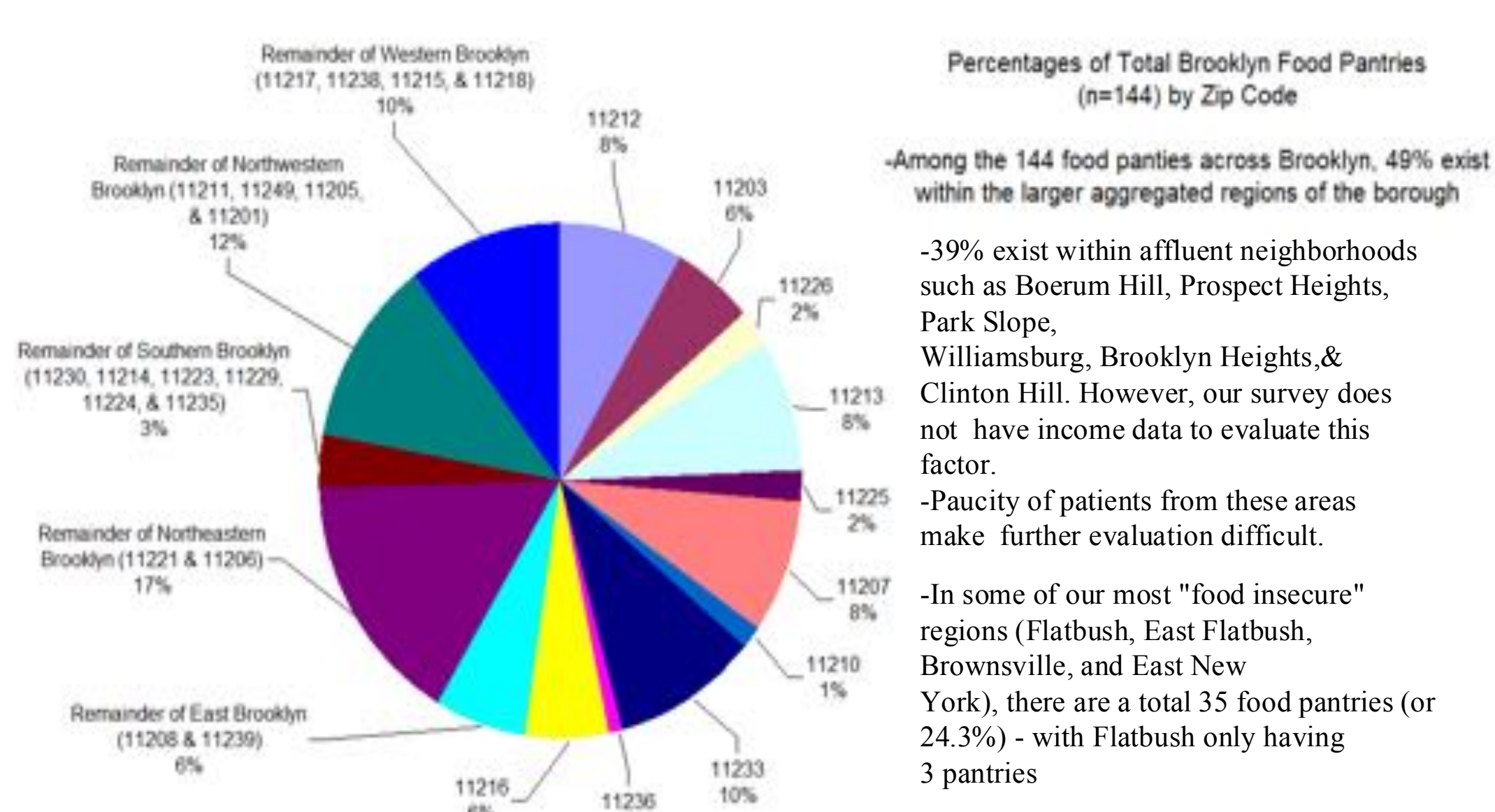


Figure 4: Percentages of Total Brooklyn Food Pantries (n=144) by Zip Code



•Fisher's exact test provided a p-value=0.118 for food insecurity vs. zip code, indicating that this was not a statistically significant result at $\alpha=0.05$

•Figures 3 & 4 show that zip codes with an affluent numbers of food pantries had a lower percentage of food insecurity compared to those with fewer food pantries (a 3.8% decrease odds of food insecurity for every additional pantry in the zip code region - as calculated via GLM model). However, this result was also not statistically significant (p-value= 0.266).

• Figure 5 showed the more educated patients are, the higher the prevalence of food insecurity expressed. 11% of individual with a college degree & beyond were food insecure. 7.5% of those with a 7th grade through high school education had concerns for food. Finally, those before a 7th grade education experienced no food insecurity. These results were found to be highly significant (p<0.001)

•Finally, we created 2 GLM regressions, each of which adjusted for education as a covariate: (1) Food insecurity vs zip code, and (2) Food insecurity vs. no# of food pantries (note: zip code & no# of food pantries were too highly correlated to be include as independent covariates in one model). Regression no#2 showed no change in significance for no# of pantries vs. food insecurity (p-value=0.203). Regression no#1 would not run properly, due to lack of power in the study.

Figure 5: Comparing Food Insecurity by Educational Level (n=333)

EDUCATION LEVEL	FOOD INSECURITY		Total
	yes	no	
Less than 6th grade education n(%)	0(0%)	24(100%)	24
7th grade thru completing high school n(%)	13(7.5%)	160(92.5%)	173
College and above n(%)	15(11.0%)	121 (89.0%)	136
Total	28	305	333

DISCUSSION & CONCLUSION

The purpose of this study was to investigate how food insecurity varies across different neighborhoods of Brooklyn, NY (as delineated by zip codes). Where there appeared to be a clear correlation between the borough's geography and food insecurity level [with more insecurity focused around the hospital – Figure 1], the relationship was not found to be significant (p=0.118). This finding likely have to do with the highly uneven sampling across zip codes.

When comparing Figures 1 & 3, zip codes with a high number of food pantries seemed to have a lower prevalence of food insecurity, compared to the zip codes with little-to-no food pantries. This does not come up as a surprise; however, it raises questions as to why food pantries are placed in areas that are well-off, instead of places that actually need them.

Finally, the only significant trend in our study suggested that the more educated an individual is, the more food insecure they are prone to be. We can speculate that this is due to higher level of complacency with food-related stress among those of lower education vs. higher education; perhaps academic stress coupled to a low-paying job also cultivates a greater level of insecurity in those more educated. However, due to lack of data, we cannot draw a definitive conclusion.

Limitations:

The major limitation in this study is the lack of data, and hence, the lack of power. A sample size of 352 spread out over 28 zip codes only allots (on average) 13 participants per zip code (see table below). As mentioned, some zip codes even had to be combined into larger regions, in order to have >10 participants. This makes food insecurity prevalences in some zip codes very unreliable (e.g. 1 insecure person in downtown Brooklyn out of 1 patient surveyed would give 11201 a food insecurity of 100%). Addition of more data from all zip codes would allow future studies to provide clearer results & permit better regression models to be built.

Zip Code/Region:	11212	11203	11226	11213	11225	11207	11210	11234
Count:	48	54	38	34	33	22	19	17
Zip Code/Region:	11233	11236	11216	East Brooklyn	Northeastern Brooklyn	Southern Brooklyn	Northwestern Brooklyn	Western Brooklyn
Count:	17	15	11	13	10	10	5	6

To conclude, while our study offers interesting preliminary results, more data and research is needed to link food insecurity to zip code, food resources, and education. However, we do have enough observational evidence to see possible discrepancies in both level of food security & allocation of resources across Brooklyn, and possibly extending throughout New York City.

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Predicting Sibling Concordance from Polygenic Heritability

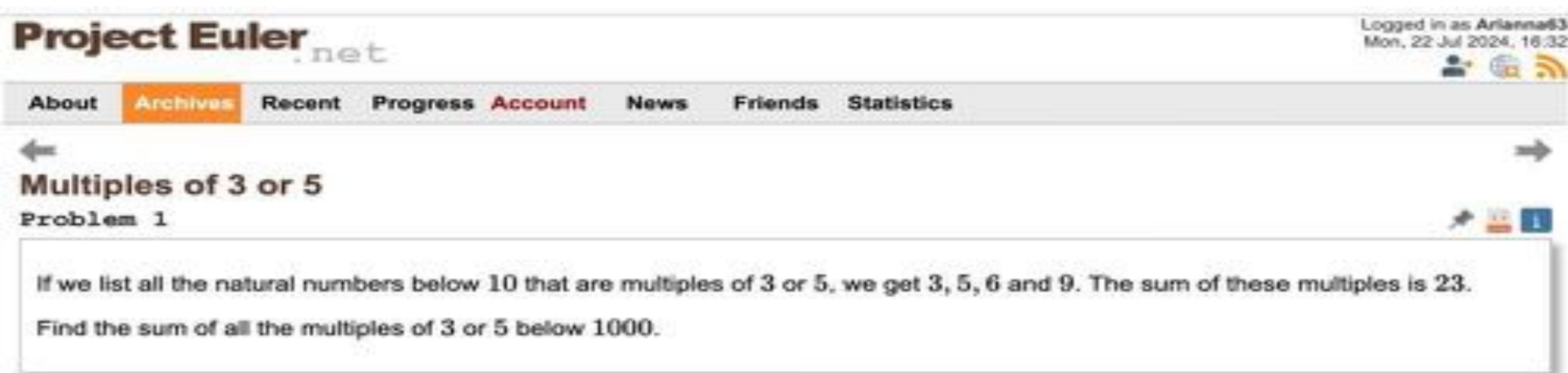
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INTRODUCTION: SCRIPTING IN PYTHON



Go to the thread for problem 1 in the forum.
Download overview for problem 1.

```
total=0

for number in range(1,1000):
    if number % 5 == 0: total += number
    elif number % 3 == 0: total += number

print(total)
```

LITERATURE REVIEW:

In Python, I created a script in order to determine the percentile of female height given in the US. Which I then used the following script in order to predict a sibling's height and the percentile they will be placed in the US. Using Z score to predict the height of siblings as well. Our theoretical framework predicts trait distributions among siblings, based on their index sibling's trait value and heritability. This framework creates statistical tests to identify complex genetic architecture. Under complete heritability, siblings of an individual with a standard normal trait value of z will have a mean trait value of z/2, accounting for three-quarters of the population variance.

The determination of a sibling's height is a multifaceted process influenced by genetic, environmental, and epigenetic variables. Height is primarily influenced by the inheritance of multiple genes from both parents, with specific loci linked to stature. Height is polygenic, which means that no single gene determines height, but rather a complex interplay of numerous genes, each with a small effect, that collectively influence the final adult height. According to heritability estimates, genetic factors account for approximately 60-80% of height variation.

Article | [Open access](#) | Published: 23 June 2016

Genetic and environmental influences on height from infancy to early adulthood: An individual-based pooled analysis of 45 twin cohorts

[Aline Jelenkovic, Reijo Sund, Yoon-Mi Hur, Yoshie Yokoyama, Jacob v. B. Hjelmborg, Sören Möller, Chika Honda, Patrik K. E. Magnusson, Nancy L. Pedersen, Svyuchi Ooki, Sari Aaltonen, Maria A. Stazi, Corrado Fagnani, Cristina D'Ippolito, Duarte L. Freitas, José Antonio Maia, Fuling Ji, Feng Ning, Zengchang Pang, Esther Rebato, Andreas Busjahn, Christian Kandler, Kimberly J. Saudino, Kerry L. Jang, — Karri Silventoinen](#) [Show authors](#)

Genetics and Genomics

Sibling Similarity Can Reveal Key Insights Into Genetic Architecture

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THEORETICAL FRAMEWORK

Analytical Framework

From infinitesimal model of quantitative genetics, the distribution of offspring conditioned on midparent genetic liability (m_g) is:

$$p(s \mid m_g) \sim \mathcal{N}(m_g, \sigma_g^2/2 + \sigma_e^2) \sim \mathcal{N}\left(m_g, 1 - \frac{h^2}{2}\right) \quad (1)$$

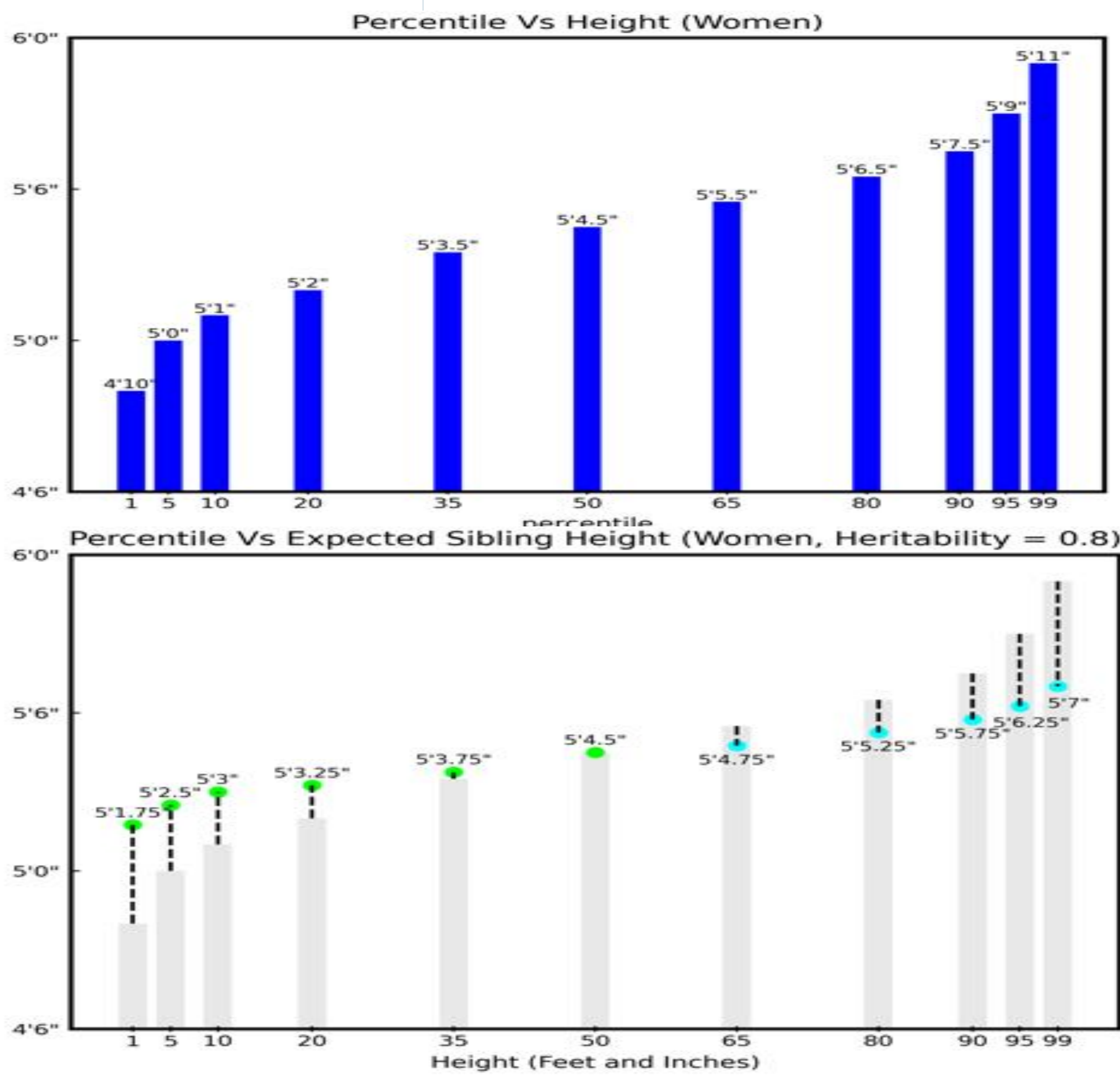
Since $p(m_g) \sim \mathcal{N}(0, h^2/2)$, from Bayes' Theorem we show that midparent liability conditional on offspring trait value (s) is:

$$p(m_g \mid s) \sim \mathcal{N}\left(\frac{1}{2}sh^2, \frac{h^2}{2}\left(1 - \frac{h^2}{2}\right)\right) \quad (2)$$

From above we calculate conditional-sibling trait distribution:

$$p(s_2 \mid s_1) \sim \int p(s_2 \mid m_g)p(m_g \mid s_1) dm_g \sim \mathcal{N}\left(\frac{1}{2}s_1h^2, 1 - \frac{h^4}{4}\right) \quad (3)$$

RESULTS:

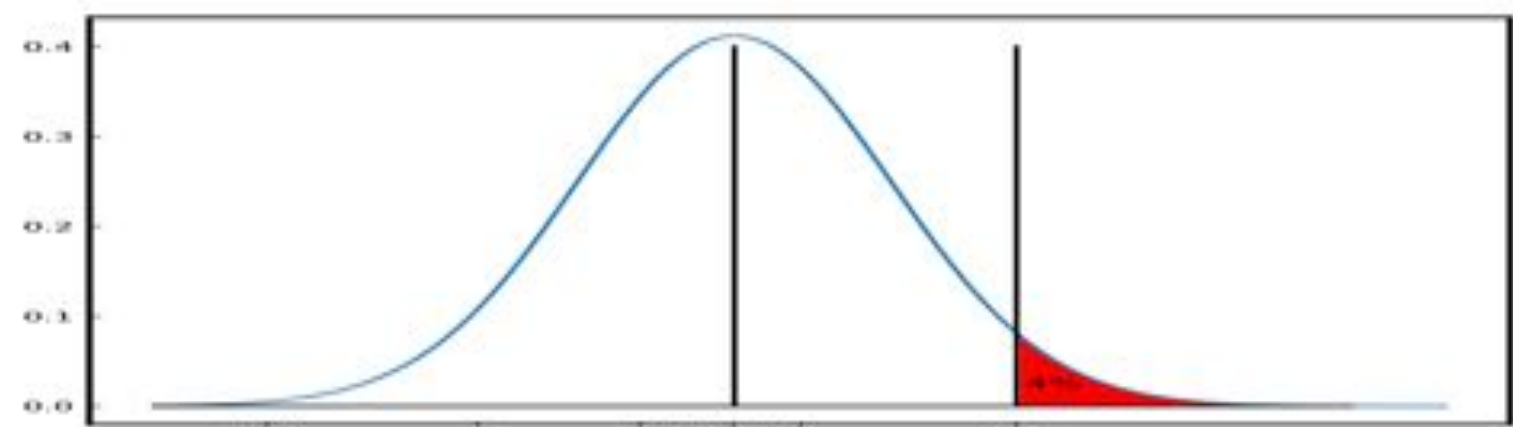


How tall is the sibling in the 95th percentile?

ADDITIONAL APPLICATION

- This model can also be used identify cases where social determinants of health "break" the model in one or more tails.
- This model can also be used to estimate the concordance between siblings for disease. Assuming schizophrenia is 50% heritable and occurs in 1% of individuals, then, conditioning on an individual with schizophrenia, what is the probability that their will also be diagnosed?

Hint: The distribution calculated from (3) is: N(0.585, 15/16)



CONCLUSION

Python's ability to handle large datasets, perform complex statistical analyses, and use machine learning algorithms makes it a powerful approach for predicting the percentile of siblings' heights. Researchers can use Python's extensive libraries, such as Pandas, NumPy, Scikit-learn, and TensorFlow, to build robust models that predict height percentiles based on genetic and environmental factors. The predictive models can be trained with historical data on siblings' heights, parents' heights, and other relevant variables, allowing for the identification of previously unknown patterns and correlations. Furthermore, Python's visualization libraries allow for clear representation of data and prediction results, which aids in better understanding and communication of the findings.

The accuracy of predictions is heavily reliant on the quality and completeness of the input data. Inaccurate, incomplete, or biased datasets can result in incorrect predictions. Furthermore, collecting comprehensive and diverse datasets can be difficult. Height is influenced by a complex interaction of genetic factors. Simplifying these into a predictive model can lead to errors. Height is polygenic, which means that many small genetic variations contribute to the trait, making it difficult to accurately measure.

In conclusion, while Python provides a powerful toolkit for predicting siblings' height percentiles, researchers must carefully consider these limitations and devise strategies to mitigate them. This includes utilizing high-quality, diverse datasets and incorporating comprehensive environmental variables.

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Determining homozygous and heterozygous alleles of mutated Sgms2 gene in mice using Polymerase Chain Reaction .



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Introduction

Polymerase chain reaction (PCR) is a widely used method in molecular biology that allows for the exponential amplification of specific DNA sequences.

One of the applications of PCR is genotyping, which is the process of determining the genetic makeup of an individual by analyzing specific DNA sequences to identify variations or mutations in genes.

Our primary objective is to identify the presence of heterozygous and homozygous alleles of mutated Sgms2 gene in mouse samples using Polymerase Chain Reaction (PCR).

Sphingomyelin Synthase 2 (SMS2) encoded by Sgms2 gene plays an important role in Systemic Lupus Erythematosus (SLE), which is an autoimmune disease that affect many parts of the body with a common sign of rash over the cheeks and nose in shape of butterfly. Studies have demonstrated that SMS2 deficiency is involved in the development of lupus diseases.

Methods

Step 1: DNA Extraction

Extract DNA from mouse tissue using the solution containing 50mM NaOH and 1M Tris-HCl. There are several components of the PCR

- 1. Forward primer - attaches to the anti-sense strand DNA template.
- 2. Genomics DNA containing WT and mutated Sgms2 genes.
- 3. Reverse primer - attached to the complementary strand of DNA (the sense strand).
- 4. DNA Polymerase - synthesizes new DNA strands to complement the template
- 5. Nucleotide dNTPs- as monomeric units which polymerize to form DNA by DNA polymerase enzyme, (usually Taq DNA polymerase).
- 6. Buffer - provides a suitable chemical environment for activity of DNA polymerase.
- 7. MgCl₂ - Mg²⁺ ions are required as a cofactor for DNA polymerase activity

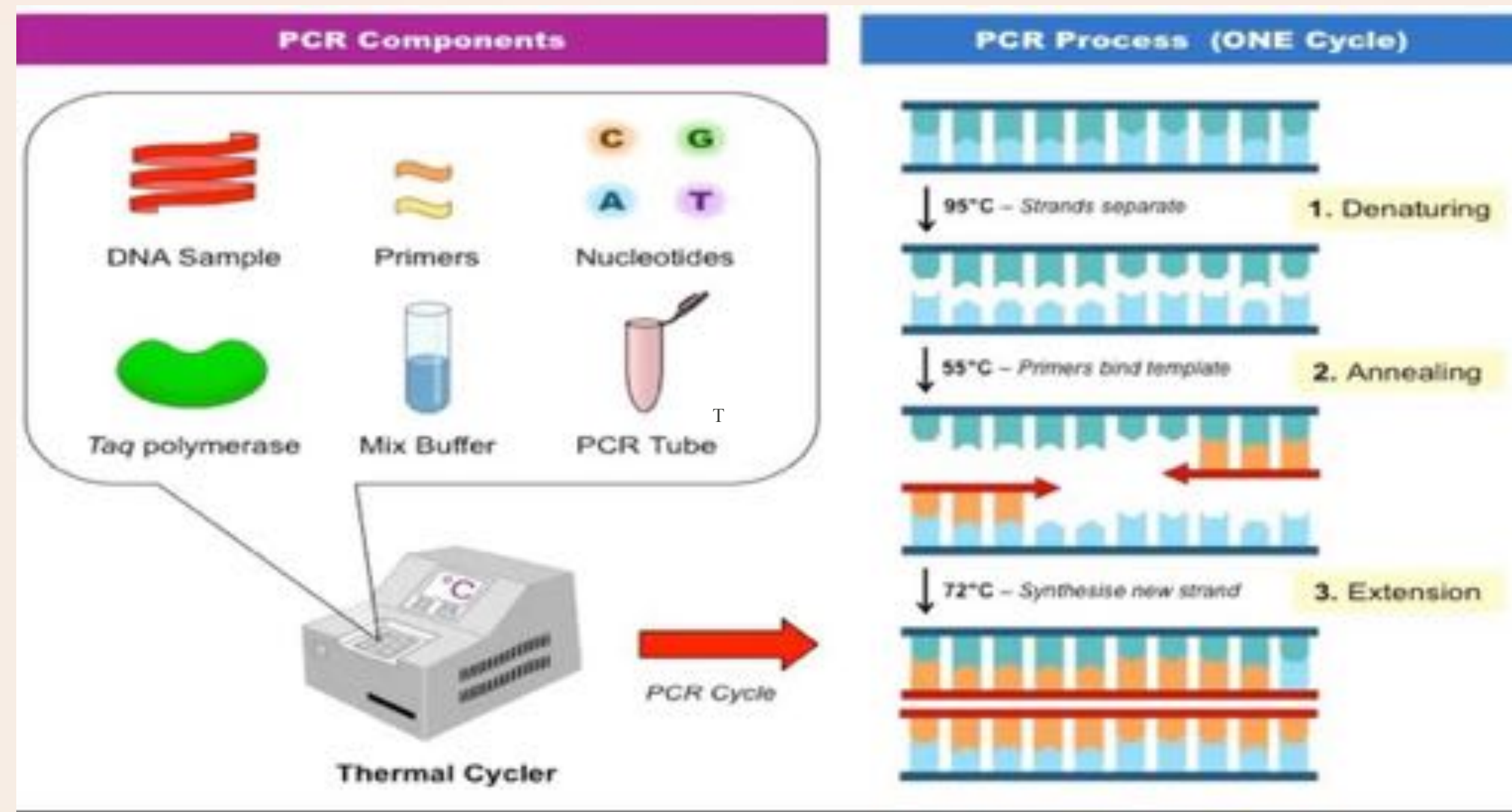


Image courtesy: faCelliate

Step 2: PCR Amplification

Amplification is achieved by series of three steps

- 1. Denaturation (95°C) -in which double-stranded DNA templates are separated by heating.
- 2. Annealing (55°C) -in which short DNA molecules called Primers bind to flanking regions of the target DNA.
- 3. Extension(72°C) -in which DNA polymerase extends the 3'end of each primer along the template strands. These steps are repeated (cycled) 25-35 times to exponentially produce exact copies of the target DNA.

Step 3: Gel imaging

We use Agarose gel electrophoresis which separates DNA products on the basis of size and charge. We dissolve 1g of Agarose in 100 ml of TAE solution. Then we load the samples on the gel and run the gel followed by imaging with BIO-RAD imaging system.

Results

After performing PCR on 7 mouse samples with Sgms2-specific forward and reverse primers, we determined that sample 1,2,3,6,and 7 were heterozygous for the Sgms2 gene, whereas samples 4 and 5 were homozygous wild type. Breeding the heterozygous mice may yield offspring with homozygous Sgms2 mutated alleles.

Discussion and Conclusion

The PCR analysis of our mouse samples revealed a mix of heterozygous and wild type genotypes for the Sgms2 gene. The finding is significant because breeding the heterozygous mice can produce offspring with homozygous Sgms2 mutated alleles, allowing us to study the function of SMS2 in the development of SLE.

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A very big thank you to Dr. Carla Boutin-Foster, Marco Stilo, Jenique Reid and the entire SUNY Downstate SPRINTER program committee.



M:DNA Ladder(100-1000bp)
Sgms2 mutated allele: 385bp
Sgms2 WT allele: 242bp
Blank control(H₂O)
C-Control

Colorectal Cancer Screening Among Black and Hispanic Residents of Brooklyn, NY: A Qualitative Study

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INTRODUCTION

- Colorectal cancer (CRC) is the third most common cancer and a leading cause of cancer death in the United States, CRC morbidity and mortality is particularly pronounced in minority communities
- According to the NIH, African-Americans are 38% to 43% more likely to die from colon cancer than are Whites
- Evidence shows that colorectal screening can reduce CRC morbidity and mortality, however, CRC screening is underutilized in the U.S. especially among black and hispanic people
- In 2016, a study showed that CRC screening rates for Blacks were 4.0% lower than the rate of Whites. contributing to higher CRC incidence and mortality among Black people in the U.S.
- Lower CRC screening rates among African-Americans are associated with late-stage diagnosis, leading to more difficult treatment and decreased survival rates.
- Understanding the barriers to CRC screening in Black and Hispanic communities is essential for developing targeted interventions to improve screening rates and early detection.
- Brooklyn, New York, with its diverse population and history of redlining, presents a unique context to explore these disparities and inform public health strategies.
- Socioeconomic factors, including income and education levels, and cultural and language barriers significantly impact CRC screening rates among Black and Hispanic populations in Brooklyn.
- Increased awareness and education about the importance of CRC screening can improve screening rates and early detection in Black and Hispanic communities.



METHODS

- In this qualitative study, we utilized purposeful sampling to recruit 19 participants aged 45–75 years, unscreened for CRC or considered high-risk due to clinical or family history, for focus groups and key informant interviews.
- Interviews were conducted in the form of a focus group online over Zoom.
- Participants were recruited from ambulatory care settings, upon discharge from inpatient hospitalizations and from University Hospital at Downstate emergency room visits with the use of flyers and emails.
- Participants completed a brief demographic questionnaire to identify patients with SDOH needs.
- To assess participants’ risks of certain SDOH, we asked “What is the highest level of education you have completed? What is your main insurance? Has lack of transportation kept you from medical appointments, meetings, work, or from getting things needed for daily living?”
- The Health Equity Implementation Framework guided data analysis and interpretation.
- The interviews were transcribed and DEDOOSE was used for the data management. In DEDOOSE, the participants' responses that were transcribed were coded & analyzed.

Most Common Ideas Regarding Colorectal Cancer Screening Shared Across Participants In Focus Group

Education/Being Informed - Socioeconomic - Personal Beliefs

- “Insurance only covers the test at required age as a barrier”.
- “Lack of advertisement.”
- “Socioeconomic [factors] as a barrier.”
- “‘Fear of knowing’ as a barrier.”
- “Other types of cancer [are] more advertised then colorectal cancer.”
- “Doctors should educate patients early on.”

Economic Stability	Neighborhood and Physical Environment	Education	Food	Community and Social Context	Health Care System
Employment	Housing	Literacy	Hunger	Social integration	Health coverage
Income	Transportation	Language	Access to healthy options	Support systems	Provider availability
Expenses	Safety	Early childhood education		Community engagement	Provider linguistic and cultural competency
Debt	Parks	Vocational training		Discrimination	Quality of care
Medical bills	Playgrounds	Higher education		Stress	
Support	Walkability				
	Zip code / geography				

Health Outcomes
Mortality, Morbidity, Life Expectancy, Health Care Expenditures, Health Status, Functional Limitations

Figure 1. This figure displays the Social Determinants of Health, which many participants’ responses along with prior studies have indicated that SDOH play significant part in accessing CRC screening.



Figure 2. This figure displays a word map of the most prevalent ideas and common themes shared across participants during the focus groups. The larger text is the more prevalent it was among participants’ responses.

RESULTS

Three themes were identified in the study:

- First: **structural inequalities arising from neglect and limited resources in comparison to other cancer conditions.**
- Second: **participants' lack of awareness and knowledge about colorectal cancer.**
- Third: **social determinants of health acting as obstacles to screening.**

Media	Year of knowing" as barrier.	Advertisement is not always enough	Discrimination rates vary depending	Doctors should educate patients	Has knowledge of symptoms, not	High trust in primary doctors	Higher rates of discrimination in	Insurance only covers the test at	aware of cancer screening. Age as	aware of family medical problems,	aware of screening process but not	awareness does not equal being	cancer associated with certain age	cancer death contributed to	cancer death contributed to gain in	color of skin/race as factor in	disability	disease not related to particular	disease not related to race,	doctor recommendation as	educating kids as motivation of	educating one for kids as motivation	exposure through family member	fear of knowing over awareness	further exposure from doctor	higher rates of discrimination in	information accessible - increased	lack of advertisement	lack of familiarity and comfort with	lack of resources for advertising
March 13 Transcript BK access.docx																														
February 6 Transcript .docx																														
April 30 Transcript.docx																														
April 2 Transcript.docx													1					1												
April 18th Transcript.docx																														
April 1 Transcript-1 BK.docx																														
March 13 Transcript_Updated.docx	4	1	3	1	1	1	1	5	2	1	1	1	2	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1
Totals	4	1	3	1	1	1	1	5	2	1	1	1	2	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1

Figure 3. The table displays the frequency of several responses (which have been coded) of participants during the focus group. The number shown next to each phrase shows how many participants said the phrase, displaying common themes among participants.

CONCLUSION

- The findings of the study can inform broader strategies aimed at reducing health disparities and promoting equity in disease prevention and care.
- Furthermore, they can address the disparities in CRC screening among Black and Hispanic adults in Brooklyn, NY who experience the highest CRC mortality rates.
- This project is ongoing, with focus groups continuing to be conducted to further this research
- Further research aims to identify and address barriers to colorectal cancer (CRC) screening in Black and Hispanic communities, ultimately reducing inequities and improving CRC outcomes in these populations

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The Impact of Blood Pressure on Premature Mortality: Insights from NHANES 2015-2016

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INTRODUCTION

This research explores the relationship between blood pressure (BP) components and premature mortality among 2015-2016 NHANES participants. The primary goal is to identify and develop inclusive approaches for enhancing BP management and mitigating premature mortality rates.

- **Blood Pressure (BP) Components:**
 - Systolic BP (SBP): Pressure during heart contraction.
 - Diastolic BP (DBP): Pressure during heart relaxation.
 - Pulse Pressure (PP): Difference between SBP and DBP.
 - Mean Arterial Pressure (MAP): Average pressure throughout cardiac cycle.
- Premature mortality: defined as death before the age of 75, primarily due to cardiovascular diseases (CVD) such as coronary artery disease (CAD), stroke, and hypertension-related complications.¹
- Research demonstrates that lower SBP and DBP levels significantly decrease the likelihood of heart attacks, strokes, and other CVDs, reducing the rates of premature mortality.
- Studies indicate that each 20 mmHg reduction in usual SBP can halve stroke mortality and decrease ischemic heart disease (IHD) mortality by one-third, while a 10 mmHg reduction in usual DBP is linked to a 45% decrease in stroke mortality and a 26% decrease in IHD mortality.²
- One of the ways to maintain and improve optimal SBP, DBP, and MAP levels is through nutrition. Dietary interventions, notably the DASH (Dietary Approaches to Stop Hypertension) diet, have proven effective in lowering BP, highlighting the role of nutrition in cardiovascular health.³

METHODS

Study Sample and Design Methodology: We used the 2015-2016 National Health and Nutrition Examination Survey (NHANES),⁴ a cross-sectional survey conducted by the National Center for Health Statistics (NCHS) to assess the health and nutritional status of Americans, linked with the National Death Index (NDI) and Linked Mortality File (LMF).

Inclusion Criteria: Our study was restricted to non-institutionalized, non-pregnant NHANES participants aged 25-64.

Outcome variables: Time to Premature Mortality from MEC (Mobile Examination Center) visits, based on 2019 NDI data.

Exposure variables: Systolic blood pressure (SBP), diastolic blood pressure (DBP), pulse pressure (PP), and mean arterial pressure (MAP), measured using standardized protocols during MEC visits.

Covariates: Age, sex, race/ethnicity, education, marital status, family income to poverty level, health insurance status, BMI, prior diagnosis of cardiovascular condition, smoking status, depression, prior diagnosis of diabetes, prior diagnosis of hypertension, prior diagnosis of hyperlipidemia, and recreational physical activity.

Statistical Analysis: All analyses were performed in SAS v9.4 and IBM SPSS v29. We used Cox proportional hazard regression models with adjustments for demographic, socioeconomic, and clinical factors.

Table 1. Sociodemographic and Clinical Characteristics of the Study Sample (N = 3617)

Characteristics	N (Weighted Percent)	
Age (in years)		
	25-34	949 (26.9%)
	35-44	900 (23.8%)
	45-54	927 (26.9%)
	55-64	841 (22.4%)
Sex		
	Male	1735 (49.7%)
	Female	1882 (50.3%)
Race/Ethnicity		
	Non-Hispanic White	1056 (61.5%)
	Non-Hispanic Black	811 (12.0%)
	Hispanic	1140 (16.8%)
	Non-Hispanic Asian	481 (6.2%)
	Non-Hispanic of Other Races	129 (3.5%)
Education		
	≤ High School	1569 (33.4%)
	Some College	1057 (31.5%)
	≥ Bachelor Degree	991 (35.1%)
Family Income to Poverty Ratio (PIR)		
	< 100% FPL	695 (13.8%)
	100-299% FPL	1426 (35.8%)
	≥ 300% FPL	1168 (50.4%)
Any Cardiovascular Conditions		
	Yes	225 (4.9%)
	No	3392 (95.1%)
Depression		
	Yes	265 (7.5%)
	No	2951 (92.5%)
Access to Health Insurance		
	Yes	2836 (84.0%)
	No	776 (15.9%)
Diagnosed with Hypertension		
	Yes	1096 (27.4%)
	No	2518 (72.5%)
Diagnosed with High Cholesterol		
	Yes	1061 (29.1%)
	No	2534 (70.4%)
Diagnosed with Diabetes		
	Yes	421 (8.9%)
	No	3125 (89.1%)
	Borderline	2 (0%)
Any Recreational Physical Activities		
	Yes	1838 (56.9%)
	No	1779 (43.1%)

Data are summarized using count (percent). Analyses were adjusted by population weight for generalizability to the non-institutionalized U.S. population aged 25-64. All analyses accounted for the multi-staged sampling design of NHANES.

Table 2. Summary of Blood Pressure Parameters

Predictor	Mean (SE)	95% CI
Systolic Blood Pressure	121.49 (0.40)	(120.64, 122.35)
Diastolic Blood Pressure	72.36 (0.52)	(71.23, 73.49)
Pulse Pressure	49.13 (0.58)	(47.90, 50.37)
Mean Arterial Pressure	88.74 (0.40)	(87.87, 89.60)

Data are summarized as mean with standard errors (SE). Analyses were adjusted by population weight for generalizability to the non-institutionalized U.S. population aged 25-64. All analyses accounted for the multi-staged sampling design of NHANES. Standard errors were computed using Taylor's Series Linearization.

RESULTS

The final analytic sample was 3617, representing 65,723,783 non-institutionalized Americans between the ages of 25 to 64.

Summary of the sample

- **Gender Distribution:** Approximately 50% male.
- **Mean Age:** 43.72 (*SE* = 0.37).
- **Education:** Nearly 35% reported having a college degree or more.
- **Race/Ethnicity:** The study cohort was primarily non-Hispanic White (61.5%)
- **Socioeconomic Status:** About 14% of the sample live below the federal poverty level (FPL).
- **Prevalence of Heart Conditions:** Only about 5% reported having been told by a physician or other healthcare providers that they have a heart condition.
- **Physical Activity:** Surprisingly, over 50% reported being physically active, performing any moderate and vigorous recreational physical activities.
- **Prevalence of Hypertension:** About 27% of the subsample reported having been told by a provider that they have hypertension.
- **Blood Pressure:** The average SBP in the subsample was 121.49 (*SE* = 0.40) mmHg and the average DBP was 72.36 (*SE* = 0.52) mmHg.
- **Health Insurance:** Access to health insurance remains high (84%).

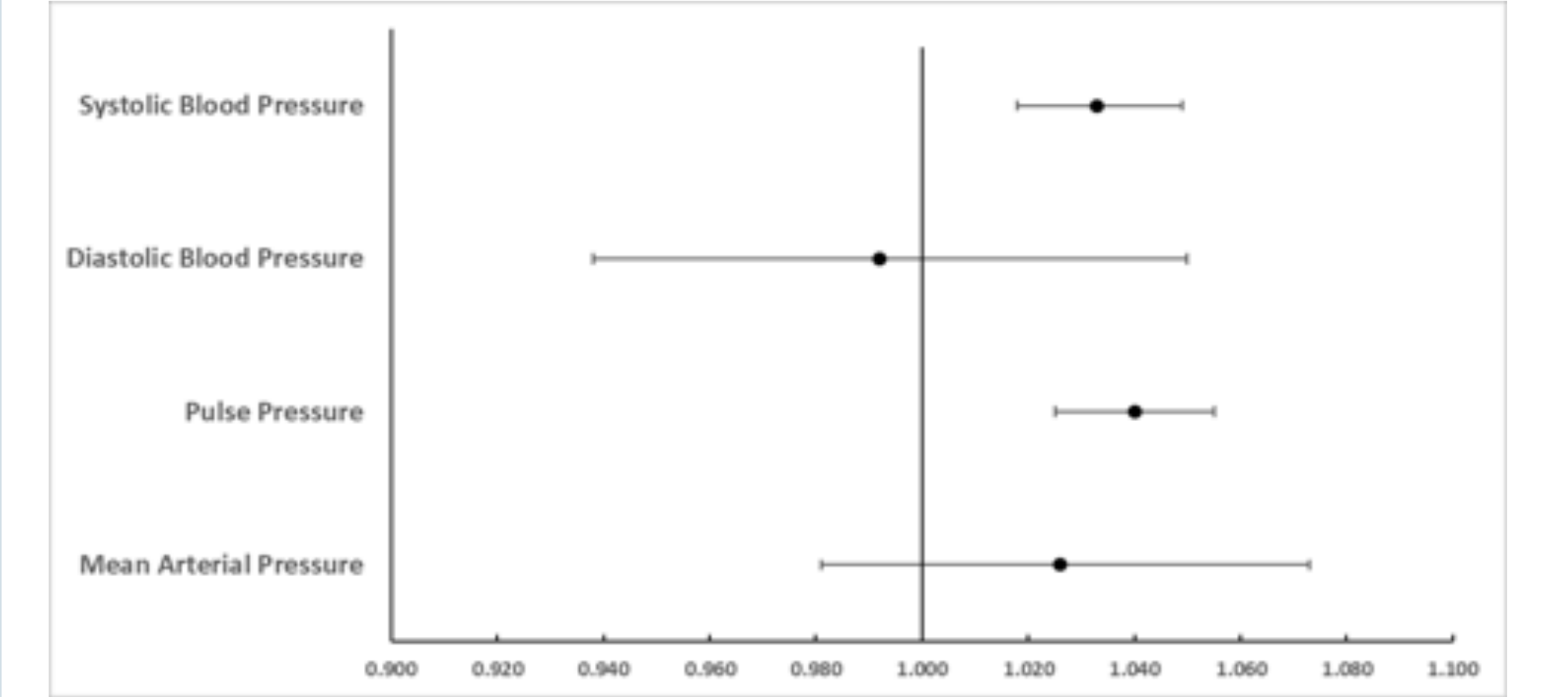
Association of BP Parameters with Premature Mortality

- An increase in SBP and an increase in PP were both associated with an increased risk of premature mortality (HR = 1.033, 95% CI = [1.018, 1.049]) and (HR = 1.040, 95% CI = [1.025, 1.055]). However, DBP and MAP were not found to be associated with premature mortality. [Figure 1]
- These results are consistent after adjustment of sociodemographic and clinical characteristics of the study sample (HR = 1.025, 95% CI = [1.007, 1.044]) and (HR = 1.027, 95% CI = [1.007, 1.048]). [Figure 2]

Association of Selected Covariates with Premature Mortality

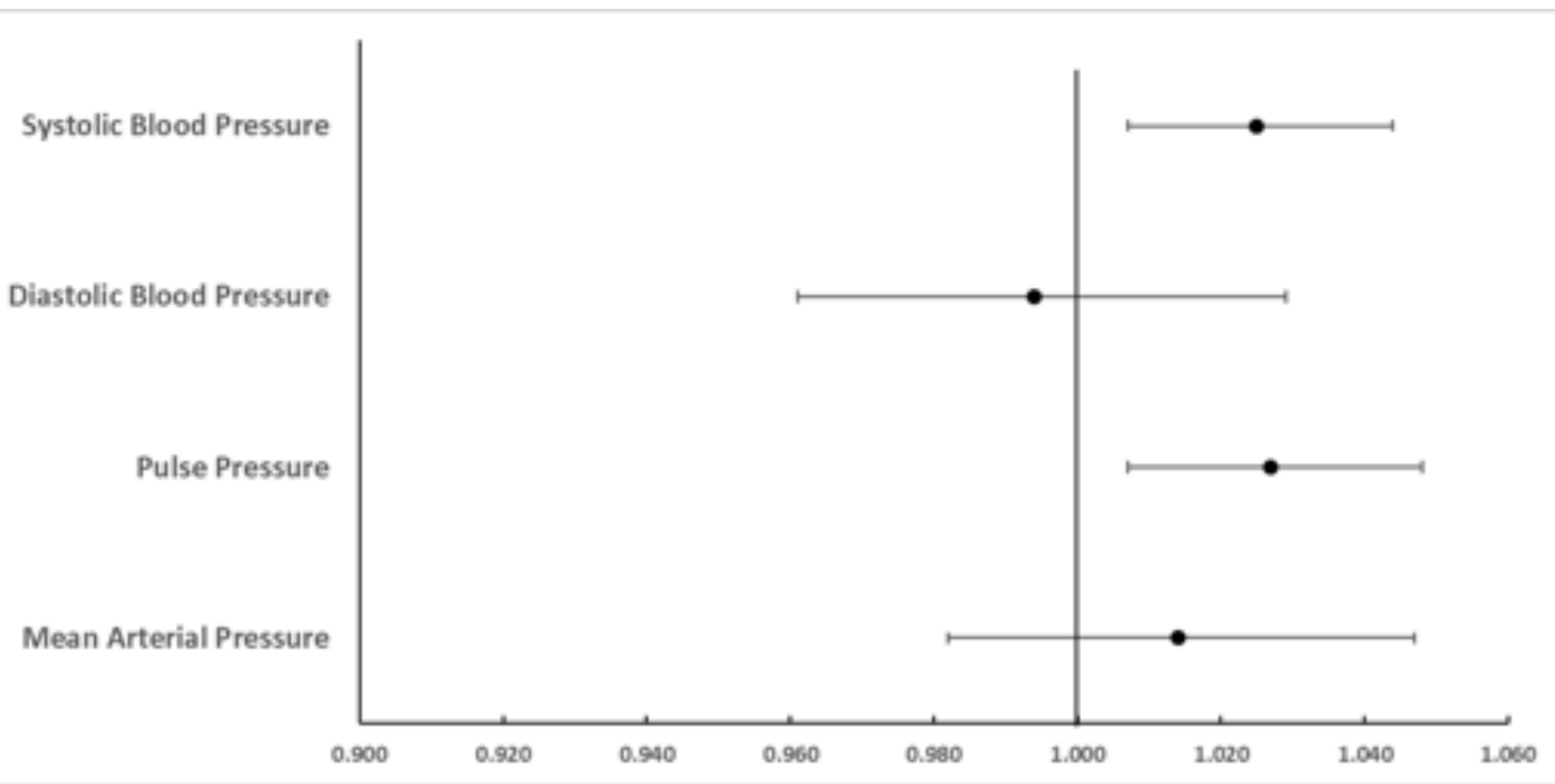
- Being Asian and Hispanic were found to be protective against premature mortality in the SBP and PP models.
- Being in the lowest PIR category increased the risk of premature mortality in all models.
- Being female decreased the risk of premature mortality in all models.

Figure 1: Univariate Association of Blood Pressure Measurements with Premature Mortality



We fit a Cox proportional hazards model to measure the unadjusted hazard ratios (HRs), with 95% confidence intervals to understand the association of each BP parameter with premature mortality. Analyses were adjusted by population weight for generalizability to the non-institutionalized U.S. population aged 25-64. All analyses accounted for the multi-staged sampling design of NHANES. Standard errors were computed using Taylor's Series Linearization.

Figure 2: Adjusted Association of Blood Pressure Measurements with Premature Mortality



We fit a Cox proportional hazards model to measure the covariate-adjusted hazard ratios (HRs), with 95% confidence intervals to understand the association of each BP parameter with premature mortality. Analyses were adjusted by population weight for generalizability to the non-institutionalized U.S. population aged 25-64. All analyses accounted for the multi-staged sampling design of NHANES. Standard errors were computed using Taylor's Series Linearization.

CONCLUSION

- Higher levels of SBP and PP are associated with an increased risk of premature mortality due to cardiovascular diseases and hypertension-related complications.
- A reduction of 10 mmHg in SBP has been shown to significantly lower the risk of stroke mortality, heart disease, and all-cause mortality, emphasizing the importance of blood pressure management.
- Elevated SBP and PP can cause chronic stress and damage to blood vessels, leading to atherosclerosis, increased arterial stiffness, and end-organ damage. This, in turn, can heighten the risk of cardiovascular events like heart attacks and strokes, contributing to premature mortality.
- High SBP and PP impose a greater workload on the heart. This could lead to left ventricular hypertrophy, heart failure, and other cardiovascular complications, increasing the risk of early death.
- Monitoring and managing SBP and PP is important to reduce mortality risk, even after accounting for sociodemographic and clinical factors.
- The NHANES uses a complex sampling design with survey weights and produces representative and generalizable sample estimates.
- Since most of the questionnaires were collected through surveys, some of the responses may suffer from recall bias and/or social desirability bias.
- Due to limitations in the NHANES demographic questionnaire, the result can only be generalized to heterogeneous racial/ethnic categories.

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Environmental Quality of Life & Understanding The Association Between Living Conditions and Perceptions of Climate-Related Adversities Amongst NYC Residents



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INTRODUCTION

- ❖ Quality of life remains a topic of discussion, when considering climate-related adversities and vulnerability to environmental disasters and illness for residents in urban cities, especially those living in New York City.
- ❖ The goal of this study is to understand the attitudes and perceptions around residential environmental health and quality of life issues that may aggravate climate-related exposures which are paramount to fostering urban climate durability.

With environmental quality of life surveys (EQoLS), this research will be testing if there is a proportional correlation between:

- ❖ Unfavorable indoor living conditions (presence of mold, pests, or other unfavorable factors) observed by individuals VS
- ❖ Concerns towards climate change such as higher concern for vulnerability to disease and climate disasters amongst individuals living in said conditions.

MATERIALS/METHODS

- ❖ A cross-sectional study was performed with a sample size of 88 participants, most of whom resided in New York City, specifically Brooklyn and Queens.
- ❖ A 45-question EQoL survey was sent out to different participants to obtain information on demographics, indoor household environmental conditions, neighborhood and built environment, and level of environmental preparedness. Participants remained anonymous, as all identifiable data such as zip code, race, and income were removed.
- ❖ This data was recorded on a Likert scale from 1 (never) to 3 (always); our main predictor and main outcome variables were recorded on such a scale.
- ❖ The main predictor for this research was the indoor household conditions of the participants. Perception of indoor household quality included the presence of mold, pests, lack of vents, etc., as well as the corresponding satisfaction level with household condition.
- ❖ The main outcomes were: Individual perceptions of their preparedness against climate change adversities, such as infectious diseases, coastal storms, etc., and their level of concern about these issues.
- ❖ The results were analyzed using bivariate correlation analysis on SPSS version 29/28. The correlations were performed using both Pearson's and Spearman's coefficient tests, alongside frequency tests, to get a statistical breakdown of individual-level demographics. All tests were performed at the .05 significance level.

TABLE 1

Exposure Concerns Vs Overall Indoor Home Satisfaction and Air Quality Rating		
Concerns	Overall satisfaction with their indoor home environment	Rating of air quality inside of home
Infectious Diseases (e.g. Influenza, pneumonia, tuberculosis)	Correlation coefficient: -.242 Sig. .031 N= 79	Correlation coefficient: -.216 Sig. .056 N= 79
Extreme Weather (e.g. hurricane, flooding, natural disaster, etc.)	Correlation coefficient: -.145 Sig. .200 N= 80	Correlation coefficient: -.080 Sig. .479 N= 80
Coastal Storms	Correlation coefficient: -.021 Sig. .854 N= 80	Correlation coefficient: -.001 Sig. .996 N= 80
Chronic Diseases (e.g. heart disease, obesity, diabetes, asthma, etc.)	Correlation coefficient: -.353 Sig. .001 N= 80	Correlation coefficient: -.377 Sig. <.001 N= 80
Extreme Temperatures	Correlation coefficient: -.189 Sig. .093 N= 80	Correlation coefficient: -.214 Sig. .056 N= 80
Winter Storms	Correlation coefficient: -.230 Sig. .040 N= 80	Correlation coefficient: -.118 Sig. .298 N= 80
Loss of power/Utilities	Correlation coefficient: -.274 Sig. .014 N= 80	Correlation coefficient: -.126 Sig. .264 N= 80

FIGURE 1 DEMOGRAPHICS

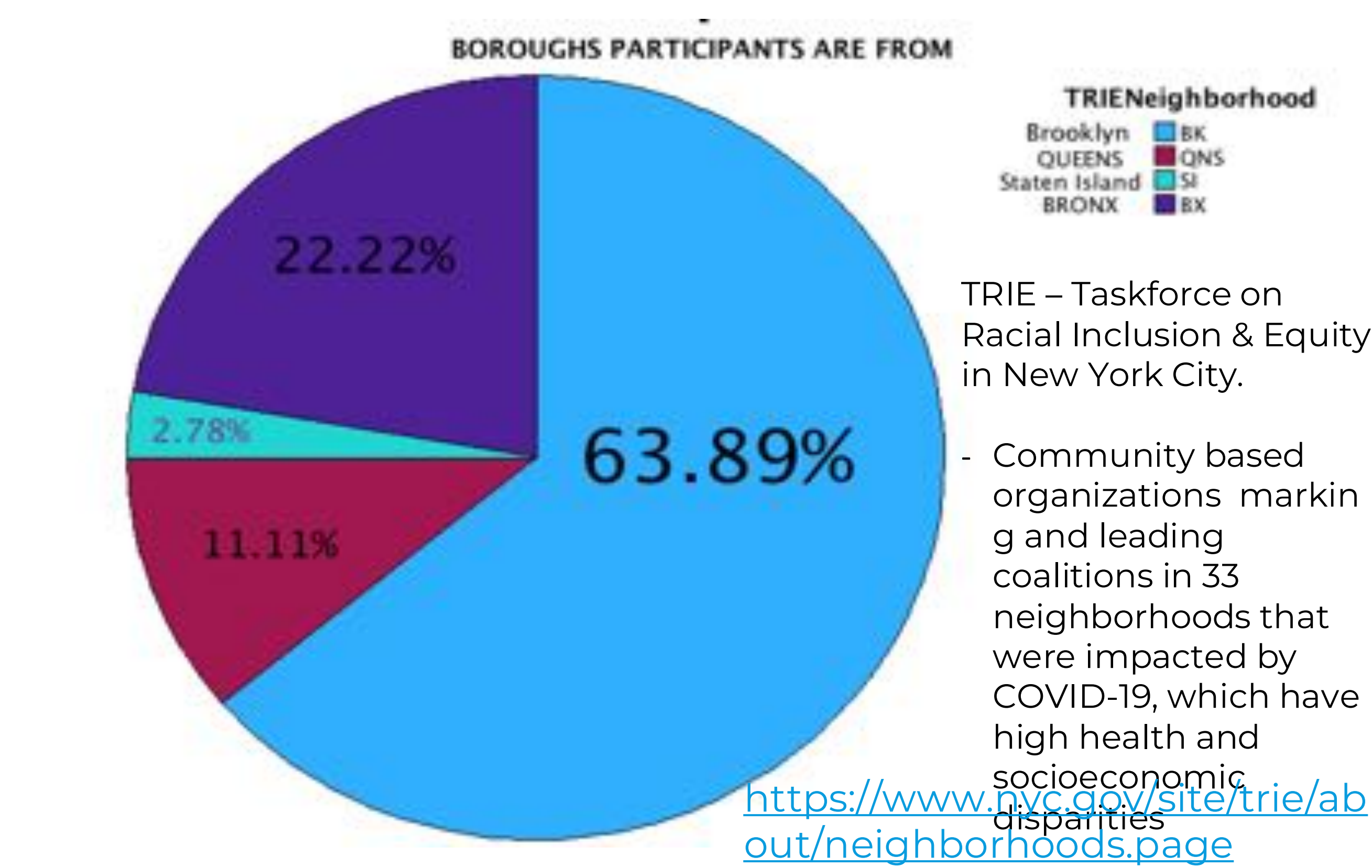


TABLE 2

Main Home Defects Vs Exposure Concerns (N=41)			
Main Defects in Home	Exposure Concern in Home Country "FOOD CLIMATE"	Exposure Concern in Home Country "H2O Pollution"	Exposure Concern in Home Country "EXTREME WEATHER"
Plumbing	Correlation Coefficient: .357 Sig. .022 N= 41	Correlation Coefficient: .095 Sig. .0556 N= 41	Correlation Coefficient: .347 Sig. .026 N= 41
Electricity	Correlation Coefficient: .165 Sig. .304 N= 41	Correlation Coefficient: .231 Sig. .147 N= 41	Correlation Coefficient: .116 Sig. .471 N= 41
Heat	Correlation Coefficient: .354 Sig. .023 N= 41	Correlation Coefficient: .124 Sig. .459 N= 41	Correlation Coefficient: .180 Sig. .477 N= 41
Floods/ Ceiling Leaks	Correlation Coefficient: .315 Sig. .045 N= 41	Correlation Coefficient: -.045 Sig. .779 N= 41	Correlation Coefficient: .155 Sig. .333 N= 41
Air Conditioning	Correlation Coefficient: .200 Sig. .209 N= 41	Correlation Coefficient: .458 Sig. .002 N= 41	Correlation Coefficient: .184 Sig. .249 N= 41
H2O Quality	Correlation Coefficient: .381 Sig. .014 N= 41	Correlation Coefficient: .061 Sig. .704 N= 41	Correlation Coefficient: .050 Sig. .756 N= 41

RESULTS

- ❖ When observing the Pearson correlation between continuous values "overall satisfaction with home" and "air quality in home", a strong correlation value of .714 with a significance of <.001 was found. These two had a directly proportional relationship.
- ❖ In table 1, the following variables were significant: Chronic Diseases Vs Air Quality (p <.001), Chronic diseases Vs Satisfaction (p=.001), Loss of power/utilities Vs satisfaction (p=.014), Infectious diseases Vs Satisfaction (p=.031), winter storms Vs satisfaction (p=.040). All these variables showed a weak, inversely proportional relationship to one another.
- ❖ In table 2, the values that held significance were: Air conditioning vs H2O pollution (p=.002), H2O Vs Food Climate (p=.014), Plumbing Vs Food Climate(p=.022), Heat vs Food Climate (p=.023), Plumbing Vs Extreme weather (p=.026), Floods/ Ceiling leaks vs Food Climate (p=.045). The associations shown by these variables were weakly directly proportional to one another.

DISCUSSION

There is a significant correlation on how the indoor living conditions may affect the climate change perception. For example, we saw how infectious diseases has a significant correlation with the air quality rating (r=0.056). This could possibly be due to concerns over seasonal airborne pathogens spreading through coughing, sneezing, etc.. For example, if we think of the flu and how kids go back to staying in cramped classrooms every fall, we can begin to understand how infections & air quality might be significantly correlated.

Food climate has been noted several times for its significance in relation to resident survival. Indoor air quality in the home (represented by potential defects in air conditioning) has a weak-to-moderate correlation to water quality; this could be potentially explained by water contamination (i.e: Legionnaires' disease, pneumonia)

Limitations:

- ❖ Our low sample size could be the reason for seeing weak correlation and non-significant result. Thus, a higher sample size could have led to some variables being significant.
- ❖ Because majority of participants were from Brooklyn, it is not likely representative of all New York City residents.

CONCLUSION

Overall, EQoLS helped us understand the association between perceptions of individuals about their homes, and the worry with being exposed to different environmental problems. Though it looks at face level satisfactions and perceptions of people's living conditions and worries, and shows that most individuals do not hold much care over climate issues, it allows us to know where change needs to be applied in order to make urban cities satisfactory to live in.

- ❖ For example, the implementation of more water fountains or facilitated access to resources that serve to solve defects in people's homes could improve household conditions and allow individuals more time to worry about environmental issues.
- ❖ These surveys will serve as ways for urban city residents to report on the conditions of their neighborhoods, and apply changes that promote preparedness against environmental disasters and encourage environmental awareness.

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Chronic Disease Prevalence in Safety Net Hospitals in the United States

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INTRODUCTION

Chronic diseases are a significant concern for the healthcare system. 1 in every 2 American adults have at least one chronic disease¹.

Safety net hospitals provide a substantial proportion of healthcare services to socially disadvantaged patients.²

As **chronic disease burden increases**, it is likely that **safety net hospitals will serve the most vulnerable patients** in our society.

It is *critical* to align resource availability to anticipated resource demands.

The objective of this study was to describe the **prevalence of common chronic diseases by hospital safety net proportion**.

METHODS

Data source and eligibility. Using a retrospective cohort design, we identified admissions for common chronic diseases in the National Inpatient Sample between 2000 and 2020. All admission among adults older than 18 years were included.

Primary exposure. Common chronic diseases included: chronic obstructive pulmonary disease (COPD), arrhythmia, congestive heart failure, cerebrovascular accident.

Primary outcome. Safety-net mix defined as annual Medicaid volume in deciles, representing increasing safety-net burden.

Statistical analysis. Linear regressions examined the association between increasing safety-net burden and chronic disease prevalence probability.

RESULTS

We identified **11,213,364 admissions** for the chronic conditions of interest. Distribution of admissions were as follows: **30.9%** for *congestive heart failure*, **25.6%** for *arrhythmia*, **22.9%** for *chronic obstructive pulmonary disease*, and **20.5%** for *cerebrovascular accident*.

Table 1. Descriptive characteristics of the cohort				
Variables	Hospital Safety-Net Deciles			P
	Lowest	Moderate	Highest	
Age, mean ± SD	73.5 ± 13.1	71.5 ± 13.6	66.9 ± 14.9	<0.001
Sex, n (%)				
Male	204,084 (47.9)	641,444 (47.5)	460,095 (49.0)	<0.001
Female	221,746 (52.1)	709,458 (52.5)	479,361 (51.0)	
Race, n (%)				
White	316,739 (86.9)	943,552 (83.1)	380,148 (45.0)	<0.001
Black	22,329 (6.1)	126,349 (11.1)	239,307 (28.3)	
Hispanic	18,043 (4.9)	50,340 (4.4)	187,960 (22.3)	
Asian	7,444 (2.0)	15,096 (1.3)	36,875 (4.4)	
Elixhauser index, mean ± SD	3.6 ± 1.7	3.9 ± 1.8	3.8 ± 1.7	<0.001

- As safety-net burden **increased**, mean age **decreased**.
- Chronic disease profile changed as safety-net burden increased:
 - Prevalence of arrhythmia decreased and COPD increased
- In the adjusted analysis, by decile, COPD diagnoses account for a **22% greater** Medicaid burden relative to CHF diagnoses.

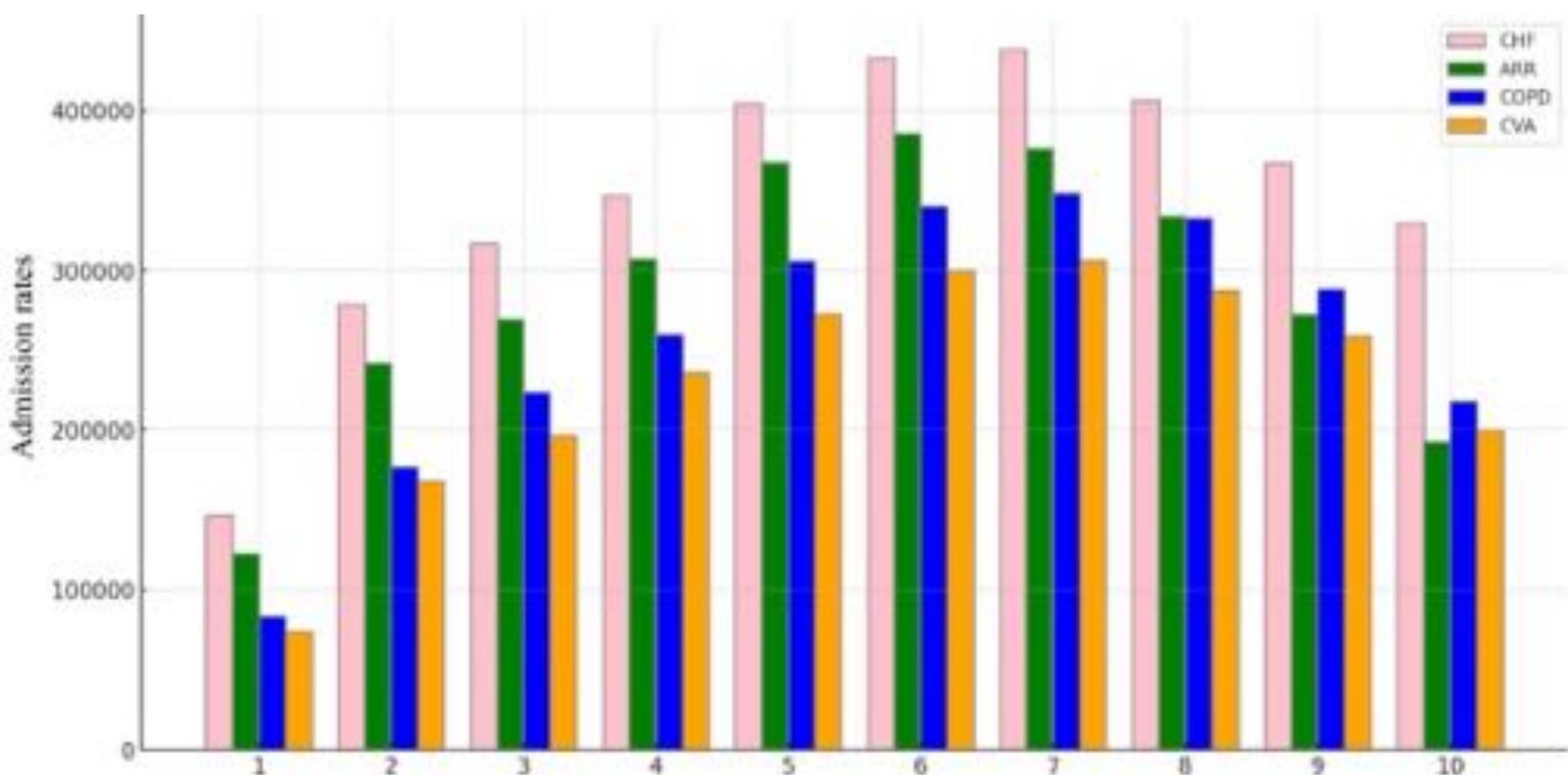


Figure 1. Distribution of disease prevalence by safety-net burden decile. Each bar represents the count of a disease category within a hospital burden decile.

Table 2. Probability of safety-net burden of treating hospital by disease				
Chronic Disease	Coefficient	95% Confidence Interval		P
		Lower	Upper	
Congestive heart failure	Reference	Reference	Reference	-
Arrhythmia	-0.03	-0.04	-0.03	<0.001
Chronic obstructive pulmonary disease	0.22	0.22	0.23	<0.001
Cerebrovascular accident	0.05	0.05	0.56	<0.001

DISCUSSION

Hospital profile of treated chronic diseases changed as hospital safety-net score increased.

Chronic obstructive pulmonary disease prevalence was significantly **higher** as safety-net burden increased. Conversely, **arrhythmia** prevalence decreased as safety-net burden increased.

Limitations. We did not analyze time series related trends. In addition, the data set does not provide granularity on individual disease severity. Further, the sample size of the data set potentially overpowered the analysis.

CONCLUSION

Chronic disease profiles are significantly different based on a hospital's patient characteristics. This should be taken into account when forecasting healthcare resources and specialist availability.

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Improving Patient Safety by Standardizing SUNY Downstate Medical Center’s NICU & PICU Intravenous (IV) Drug Concentration Library



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INTRODUCTION

Intravenous (IV) drug delivery is a complex process involving numerous steps, each of which carries a risk for potential errors. Medication-related errors tend to be more common in the Pediatric Intensive Care Unit (PICU) and Neonatal Intensive Care Unit (NICU) settings due to the limited availability of drugs specifically designed for pediatrics and neonates.

Hicks et al. showed medication errors in pediatric patients are three times more likely to cause harm than in adults, emphasizing the critical need for standardized IV drug concentrations to mitigate these risks¹. Berthe-Aucejo et al. demonstrated that standardized concentrations reduce medication preparation time, minimize the risk of compounding errors, and facilitate clearer communication among healthcare providers². Additionally, standardization has been linked to a reduction in adverse drug events in pediatric patients, further underscoring its importance.

To minimize errors, the following institutions established guidelines for standardization:

- The ASHP standards, introduced in 2008 as part of the Standardize 4 Safety initiative, aim to improve patient safety and reduce medication errors by standardizing intravenous concentrations for pediatric patients³. (Last updated: June 2024)
- Vermont Oxford (VO) and the Institute for Safe Medication Practices (ISMP) introduced standards for neonatal drug concentrations in 2011, since the ASHP standards are not always applicable to neonates due to their smaller weight⁴. (Last updated: November 2022)
- The ISMP has set forth recommendations for medications considered "high risk," which have a higher potential for medication errors and more severe consequences for patient harm if errors do occur. This 'high-risk' list is used to implement safety measures.

Purpose of standardizing drug library in hospital database:

- providing up-to-date information regarding drug concentrations, pump parameters, and dosing guidelines based on ASHP and VO guidelines
- enhancing safety by monitoring 'high-risk' medications based on ISMP guidelines
- streamlining the workflow by simplifying the calculation and verification of drug concentration
- reducing errors involved in preparation and administration

These drug libraries must be updated periodically to maintain accuracy and safety. Therefore, we updated SUNY Downstate Medical Center’s drug database and assessed the extent of changes since the last update of the standards.

The aim is to improve patient outcomes and reduce medication errors related to ordering, preparing, and administering drugs.

METHODS

Data source:

Utilized SUNY Downstate Medical Center's drug library to extract the following:

- Continuous and intermittent IV drugs used in the NICU and PICU
- Drug concentrations
- Dosing units
- Continuous & Bolus dosing HARD MAX limits (High-risk continuous IVs ONLY)
- Intermittent infusion duration limits & dosing limits (High-risk intermittent IVs ONLY)

This data will be compared to the recently updated standardized drug concentrations and the information will be updated if needed.

Data analysis:

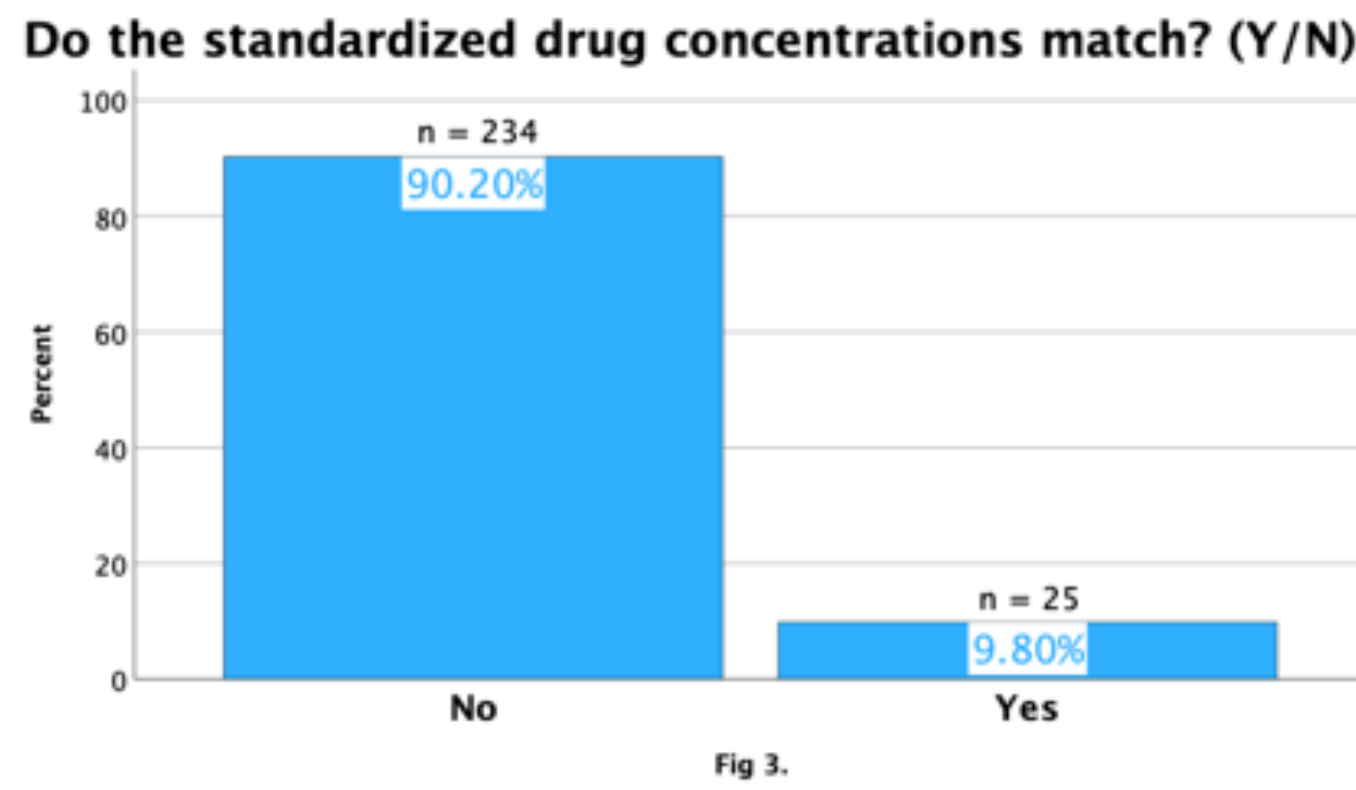
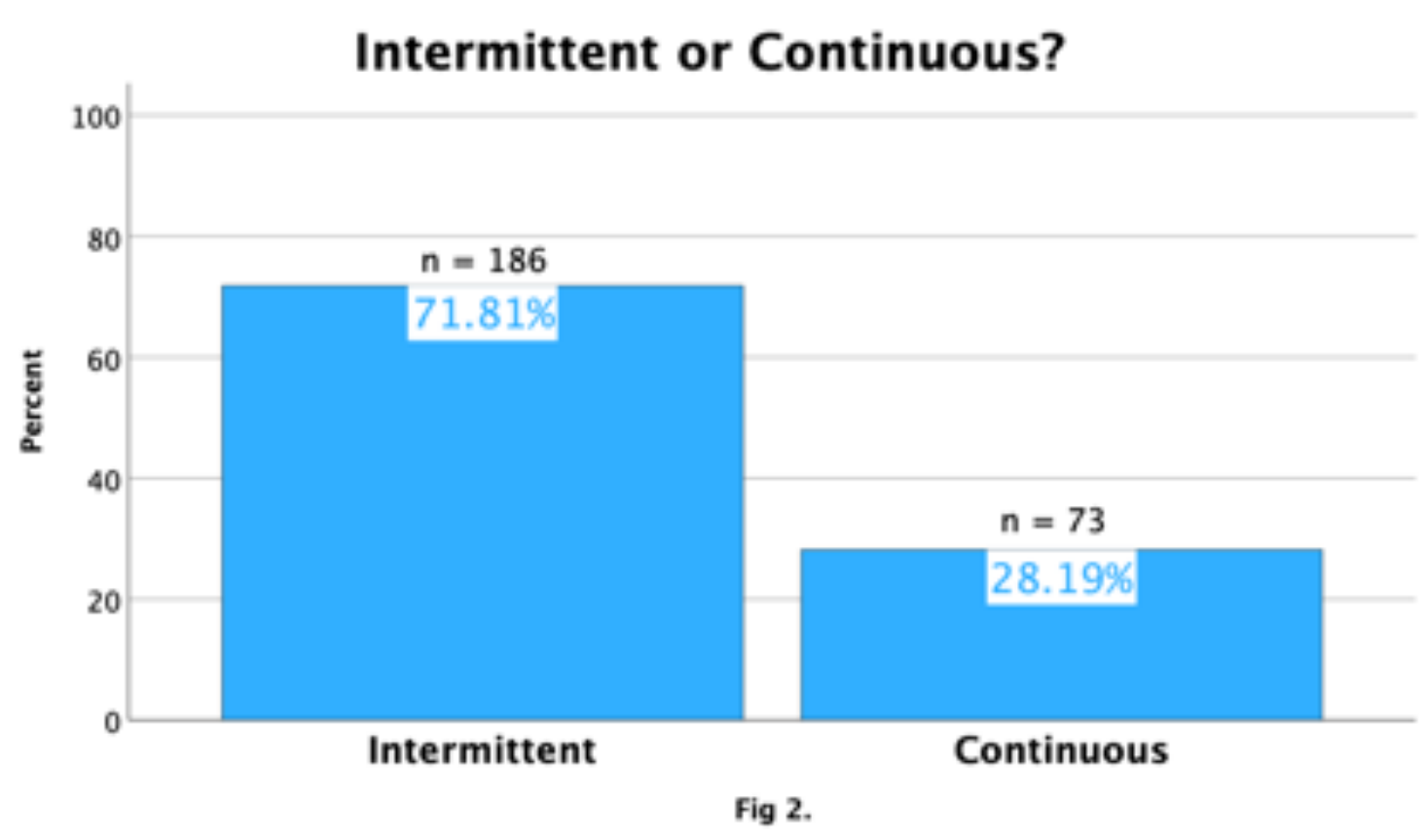
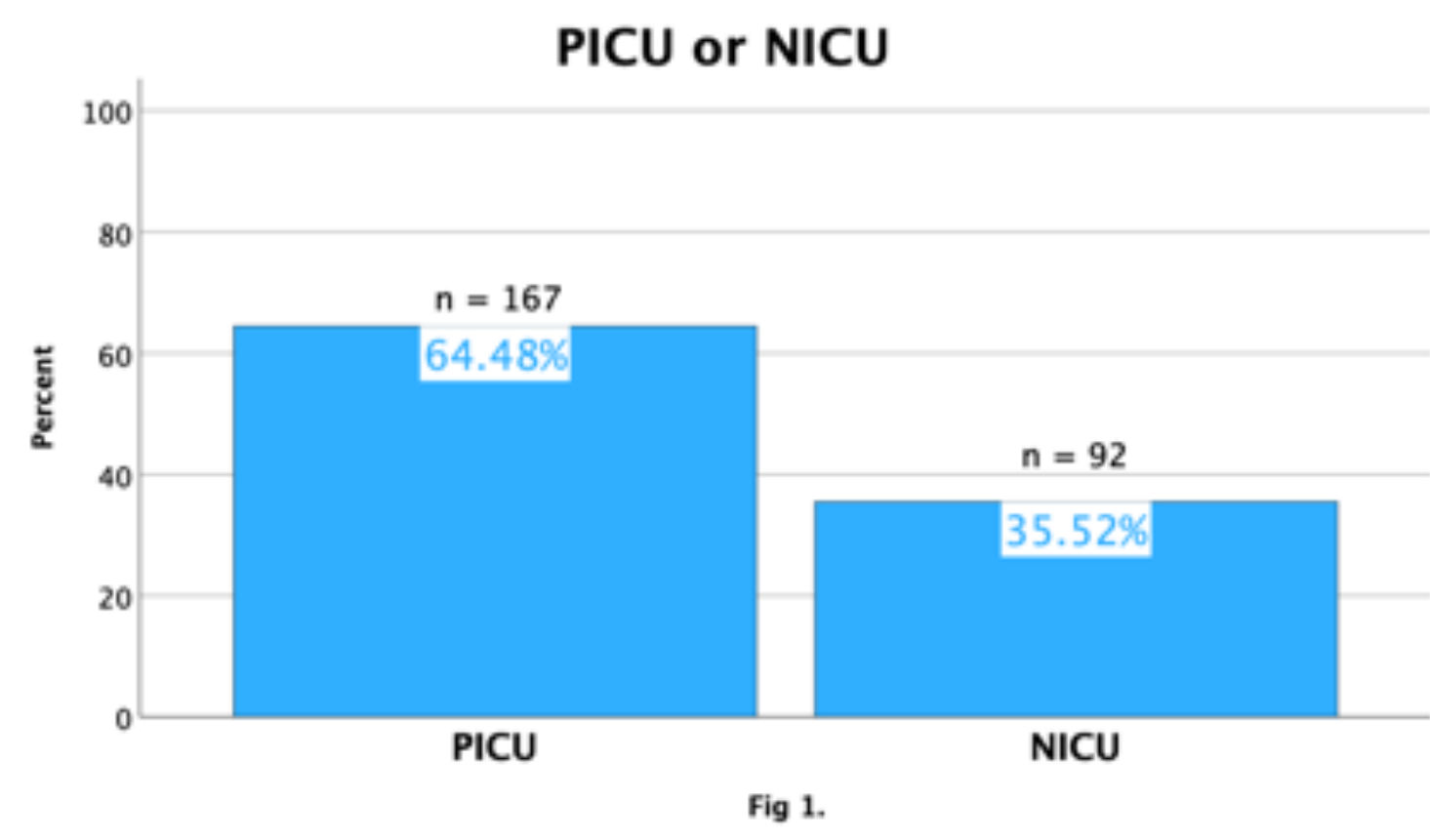
Using SPSS, we collected the following:

- % of drug concentration entries that needed to be updated based on the current recommended standards (vs the % that were currently optimized)
- % of dosing unit entries for PICU continuous IVs that needed to be updated based on the current recommended standards (vs the % that were currently optimized)
- % of "high-risk" drug entries that were identified

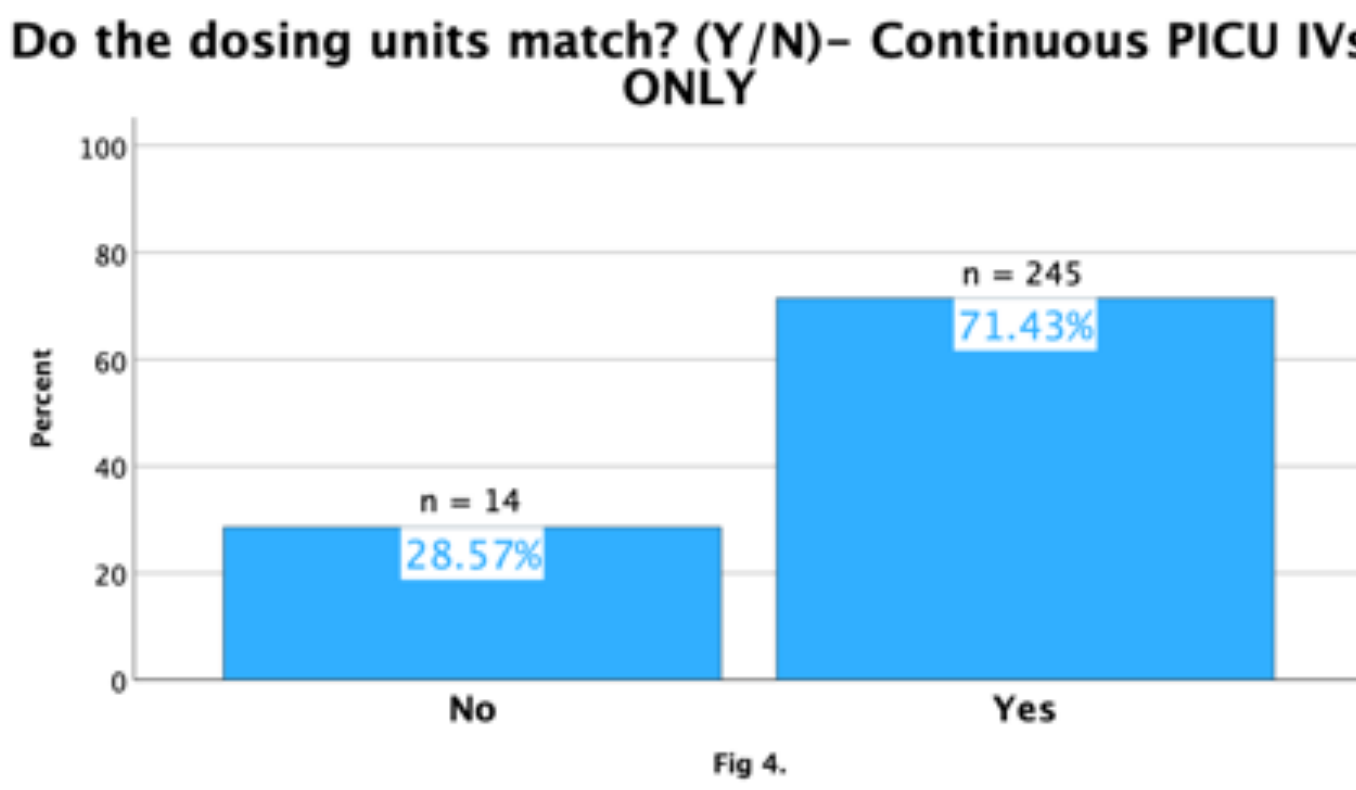
By analyzing these percentages, we will be able to assess the extent of changes since the last update of the standards,

RESULTS

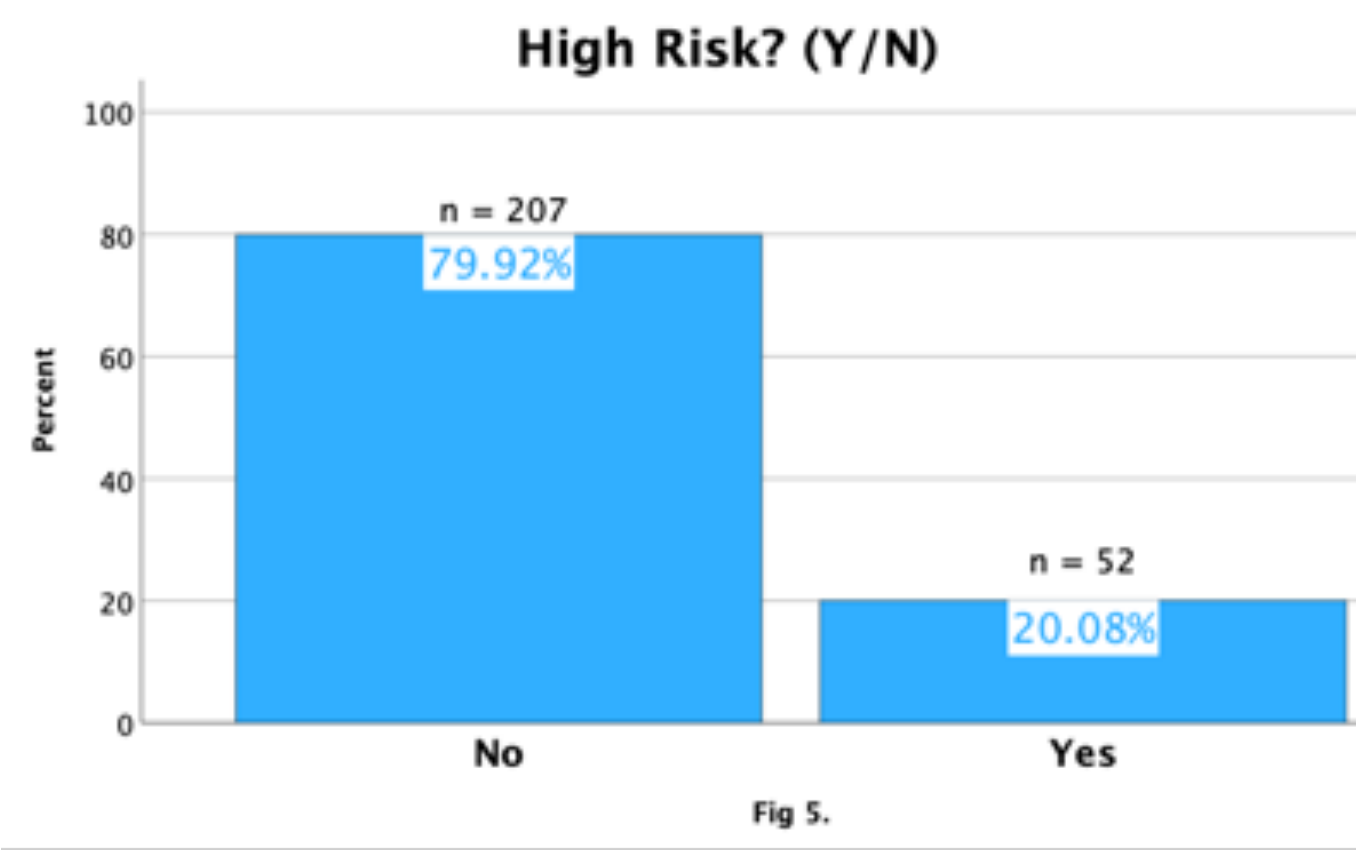
Descriptive Statistics. Fig 1-5



Approximately 90% of drug concentrations needed to be updated.



Approximately 29% of drug dosing units needed to be adjusted. This percentage takes into account only continuous IVs used in the PICU, n= 49. Therefore, the 14 entries that were updated are approximately 5.7% of total number of drugs in the library.



52 high-risk drugs were identified within the library. Modifications to their dosing and duration limits were made.

Bivariate Analysis: Chi-Squared Test.

PICU or NICU Vs. Do the standardized drug concentrations match? (Y/N)			Do the standardized drug concentrations match? (Y/N)		Total
			No	Yes	
PICU or NICU	PICU	Count	145	18	163
		% within PICU or NICU	89.0%	11.0%	100.0%
	NICU	Count	85	7	92
		% within PICU or NICU	92.4%	7.6%	100.0%
Total		% of Total	33.3%	2.7%	36.1%
		Count	230	25	255
		% within PICU or NICU	90.2%	9.8%	100.0%
		% of Total	90.2%	9.8%	100.0%

Note: Chi-Square Test provided a p-value of 0.376

Intermittent or Continuous? Vs. Do the standardized drug concentrations match? (Y/N)			Do the standardized drug concentrations match? (Y/N)		Total
			No	Yes	
Intermittent or Continuous?	Intermittent	Count	174	9	183
		% within Intermittent or Continuous?	95.1%	4.9%	100.0%
	Continuous	% of Total	68.2%	3.5%	71.8%
		Count	56	16	72
		% within Intermittent or Continuous?	77.8%	22.2%	100.0%
		% of Total	22.0%	6.3%	28.2%
Total	Count	230	25	255	
	% within Intermittent or Continuous?	90.2%	9.8%	100.0%	
	% of Total	90.2%	9.8%	100.0%	

Note: Chi-Square Test provided a p-value <0.001

DISCUSSION

- This quality improvement project aimed to standardize IV drug concentrations in the PICU and NICU at SUNY Downstate Medical Center by aligning our drug library with the latest standards set forth by ASHP, VO, and ISMP to enhance medication safety, reduce errors, and improve patient outcomes.
- We updated 230 out of 259 drug concentrations within the drug library which accounted for approximately 90% of the drugs that were extracted from the database (145 from the PICU library and 85 from the NICU library).
- There were a total of 52 (20%) high-risk drugs identified, which need additional modifications and monitoring to ensure safety in handling and administration.
- We noticed 11 drug entries of LASA (Look-Alike/Sound-Alike) medications, that required updating of tall man lettering. This way of lettering is recommended by ISMP as a safeguard to prevent confusion between two medications that either look-alike, or sound-alike (e.g., predniSONE vs. prednisoLONE).
- These updates are significant and will positively impact patient safety and clinical outcomes.

CONCLUSION

- In the future, it is essential to be vigilant as to when the standards are next updated, so that we can keep up-to-date with the pertinent drug information.
- Medication errors can be reported via KeepSafe. These records should be continuously monitored, and appropriate modifications and safeguards set in place to prevent reoccurrence.
- These efforts will contribute to safer patient outcomes.

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Does meeting the ACSM Physical Activity Guidelines reduce the likelihood of burnout in PT students



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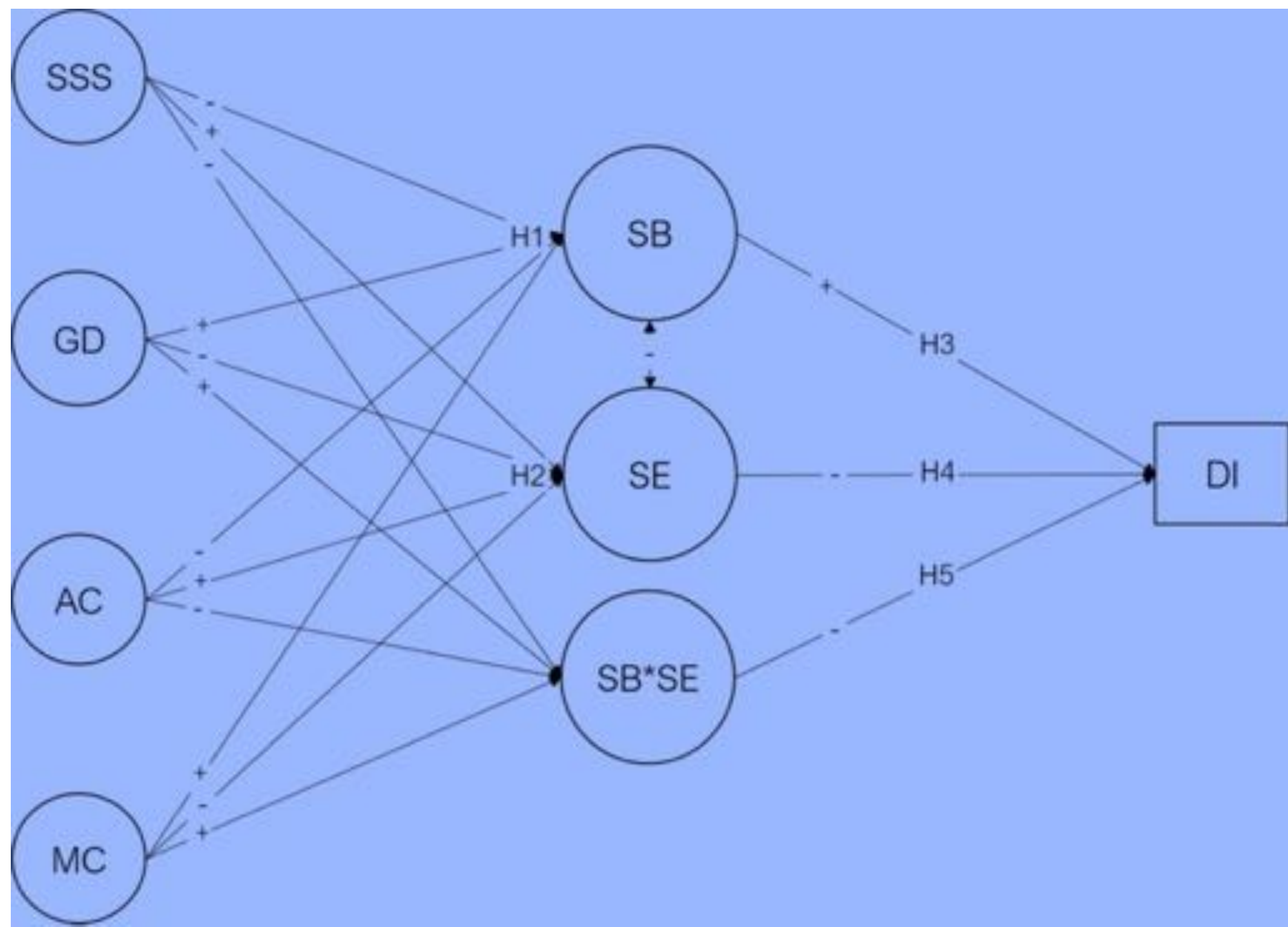
INTRODUCTION

- This summer, I joined forces with Dr. Puneet Dhaliwal and a group of her PT students in their CAPSTONE research project to determine an answer to the question: **Does meeting the ACSM Physical Activity Guidelines reduce the likelihood of burnout in PT students?**
- To aid them in their research, I spent time reading and analyzing articles pertaining to the topic.
- The group's ultimate goal is to use the findings of the articles and literature review to create and administer a survey in the fall 2024.

MATERIALS / METHODS

A textual analysis was used throughout the duration of June and July of 2024, to determine the relationship between graduate students (primarily physical therapy students) and burnout - specifically in relation to exercise and ACSM guidelines. The aim was to use these findings to shed light on the potential benefits of exercise in mitigating burnout among this study's specific cohort of students.

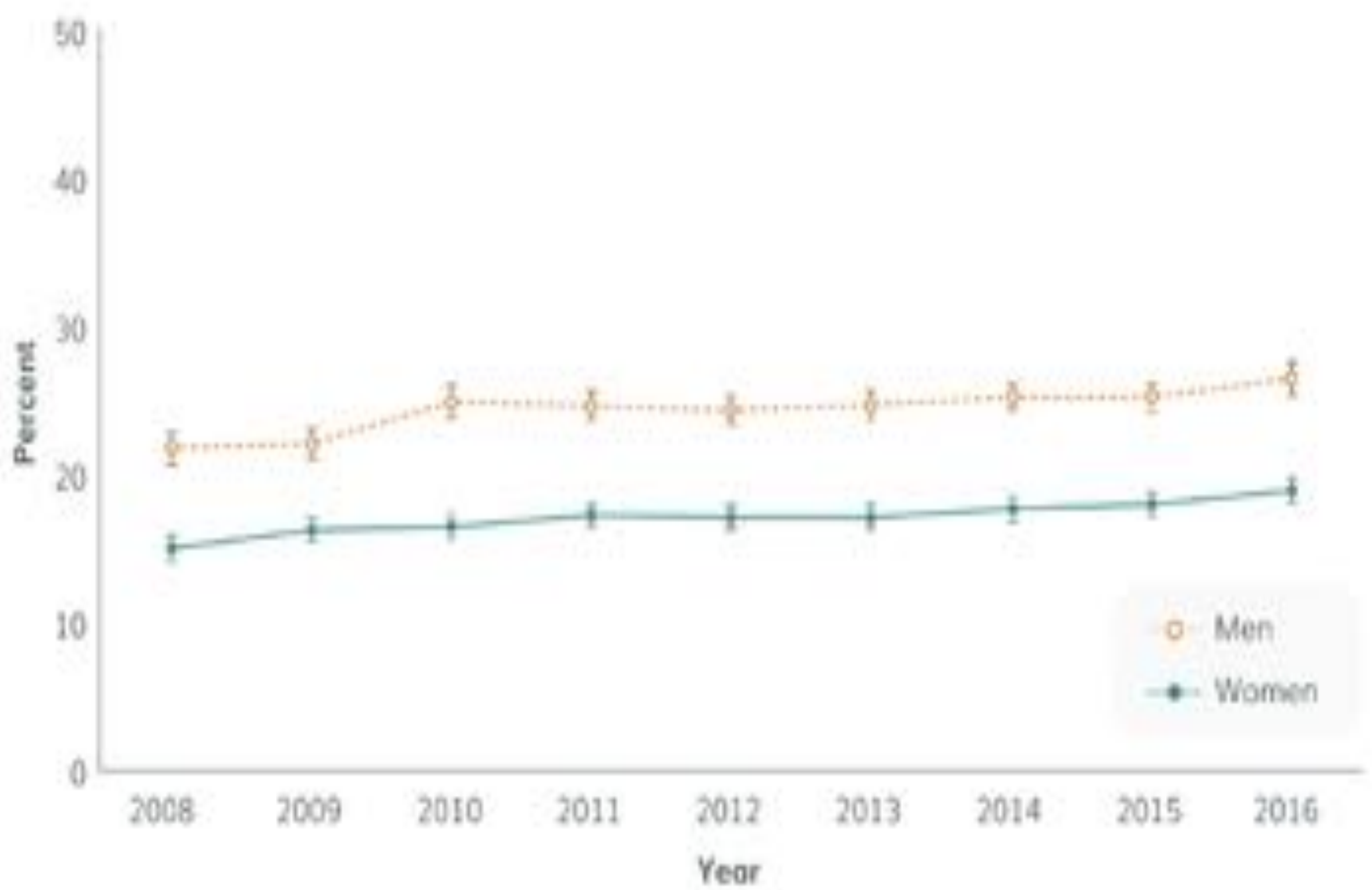
STUDENT BURNOUT AND ENGAGEMENT MODEL



Student burnout and engagement model. SSS=Satisfaction with Social Support, GD=General Distress, AC=Adaptive Coping, MC=Maladaptive Coping, SB=Student Burnout, SE=Academic Engagement, SB*SE=Student Burnout interaction with Academic Engagement, DI=Dropout Intention. Plus sign (+) represents positive expected effect and minus sign (-) represents negative expected effect.

- H1 shows that student burnout (SB) is directly related to general distress (GD) & maladaptive coping (MC), but negatively related to satisfaction with social support (SSS) & adaptive coping (AC).
- H2 conversely shows that academic engagement (SE) is directly related to satisfaction with social support (SSS) & adaptive coping (AC), but negatively related to general distress (GD) & maladaptive coping (MC).
- Finally, H3, H4, & H5 show dropout intention is directly related to student burnout (SB), but inversely related to academic engagement (SE).

Percentage of U.S. Adults Ages 18 Years or Older Who Met the Aerobic and Muscle-Strengthening Guidelines, 2008–2016



MATERIALS / METHODS

- Search engines such as PubMed and Cochrane were used to find the articles for this literature review. Keywords like "exercise", "burnout", "student" and "physical therapy" were utilized. Search criteria were limited, such that all study participants were greater than 18 years of age & all articles were written in English.
- Burnout is defined as a combination of excessive stress, inadequate sleep and lack of exercise having negative/detrimental effects on students.
- Exercise according to ACSM (American College of Sports Medicine) guidelines is categorized by age and many other factors. For the purpose of this research, the focus was on physical activity in adults, for which the ACSM recommends at least 150 minutes (2 hours and 30 minutes) to 300 minutes (5 hours) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) to 150 minutes (2 hours and 30 minutes) a week of vigorous-intensity aerobic physical activity.

RESULTS

The BMCM cross-sectional, observational study analyzed 532 medical students of FMUL, 417 were complete (n1st year=215; n2nd year=174; n pilot=28). Most students were females (71%), with a mean age of 19.48-years-old (SD=2.75), 53% from the Lisbon or Setubal districts.

- The response rate was 76%. About 78% of participants completely answered. These numbers are representative of students with higher burnout rates without social support, whereas those that have social support were prone to lower burnout rates. These numbers are supportive of this group's hypothesis.

CONCLUSION

This research had many limitations. Being that this topic was oddly specific, it was difficult to find explicit articles discussing the relationship between PT students, exercise, and burnout. That being said, the articles which were found were extremely informative, detailing the correlation between exercise (as defined by ACSM guidelines) and burnout in grad students. The information gathered from this research will help develop a survey which is better tailored to Physical Therapy students, so that our ultimate question can be answered.

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Improving Patient Safety by Standardizing SUNY Downstate Medical Center’s NICU & PICU Intravenous (IV) Drug Concentration Library



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INTRODUCTION

Intravenous (IV) drug delivery is a complex process involving numerous steps, each of which carries a risk for potential errors. Medication-related errors tend to be more common in the Pediatric Intensive Care Unit (PICU) and Neonatal Intensive Care Unit (NICU) settings due to the limited availability of drugs specifically designed for children and neonates.

Hicks et al. showed medication errors in pediatric patients are three times more likely to cause harm than in adults, emphasizing the critical need for standardized IV drug concentrations to mitigate these risks.¹ Berthe-Aucejo et al. demonstrated that standardized concentrations reduce medication preparation time, minimize the risk of compounding errors, and facilitate clearer communication among healthcare providers.² Additionally, standardization has been linked to a reduction in adverse drug events in pediatric patients, further underscoring its importance.

To minimize errors, the following institutions established guidelines for IV medication standardization:

- The ASHP standards, introduced in 2008 as part of the Standardize 4 Safety Initiative, aim to improve patient safety and reduce medication errors by standardizing intravenous concentrations for pediatric patients.³ (Last updated: June 2024)
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- The ISMP has set forth recommendations for medications considered "high risk," which have a higher potential for medication errors and more severe consequences for patient harm if errors do occur. This 'high-risk' list is used to implement safety measures.

Purpose of standardizing PICU and NICU IV drug libraries at SUNY Downstate Medical Center:

- provide up-to-date information regarding recommended IV drug concentrations, pump parameters, and dosing units based on ASHP and VO guidelines
- enhancing safety by further optimizing 'high-risk' medications based on ISMP guidelines
- streamlining the pharmacy verification by updating IV medication orders to reflect updated IV drug library concentrations
- reducing errors involved in preparation and administration by limiting available IV concentration selections to the standard concentrations

These drug libraries must be updated periodically to maintain accuracy and safety. Therefore, we updated SUNY Downstate Medical Center’s PICU and NICU continuous and intermittent IV drug libraries and assessed the extent of change in optimization according to the current standards. We further updated high-risk medication dosing limits, infusion durations, and tall-man lettering for added safety.

The aim is to improve patient outcomes and reduce medication errors related to ordering, preparing, and administering drugs.

METHODS

Data source:

Utilized SUNY Downstate Medical Center's drug library to extract the following:

- Continuous and intermittent IV drugs used in the NICU and PICU
- Drug concentrations
- Dosing units
- Continuous & Bolus dosing HARD MAX limits (High-risk continuous IVs ONLY)
- Intermittent infusion duration limits & dosing limits (High-risk intermittent IVs ONLY)

This data will be compared to the updated standardized drug concentrations and dosing limits recommended by ASHP, VO, ISMP, Neofax, and Lexicomp

Data analysis:

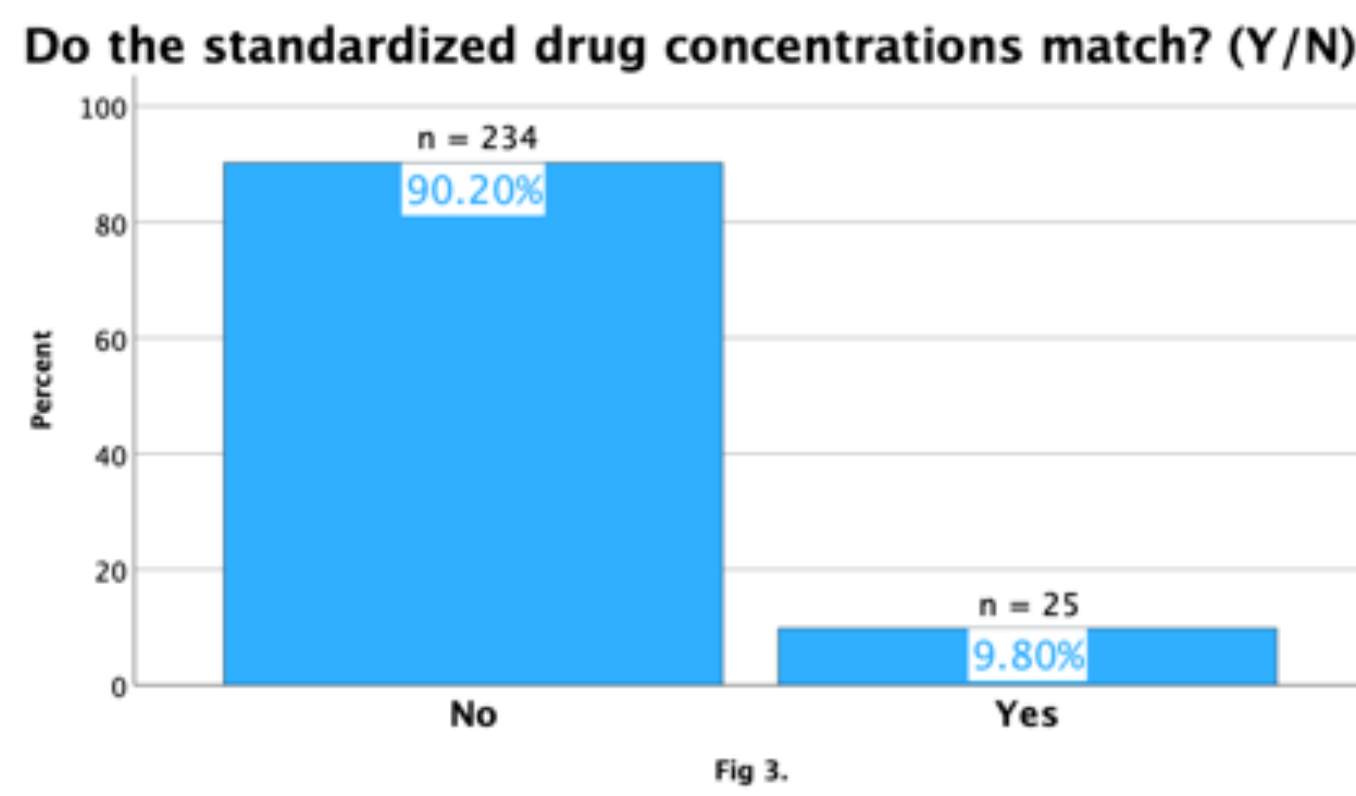
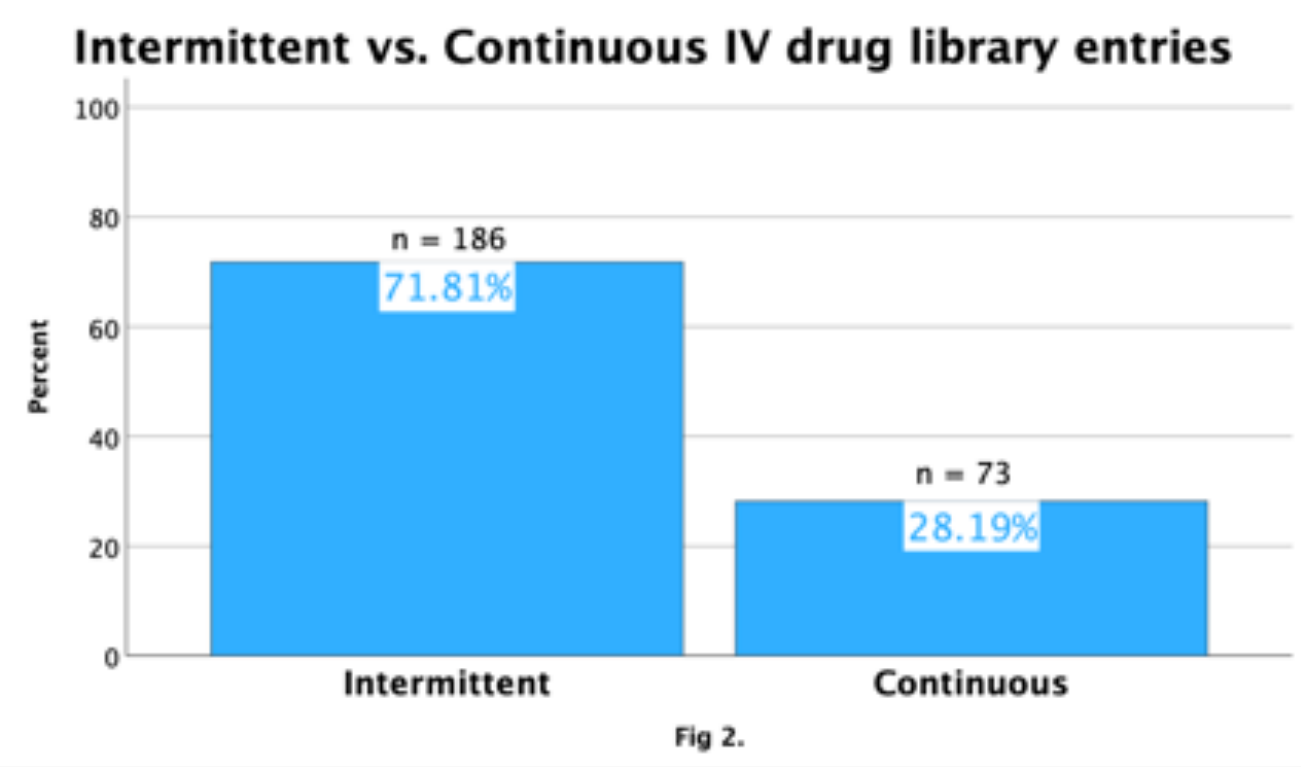
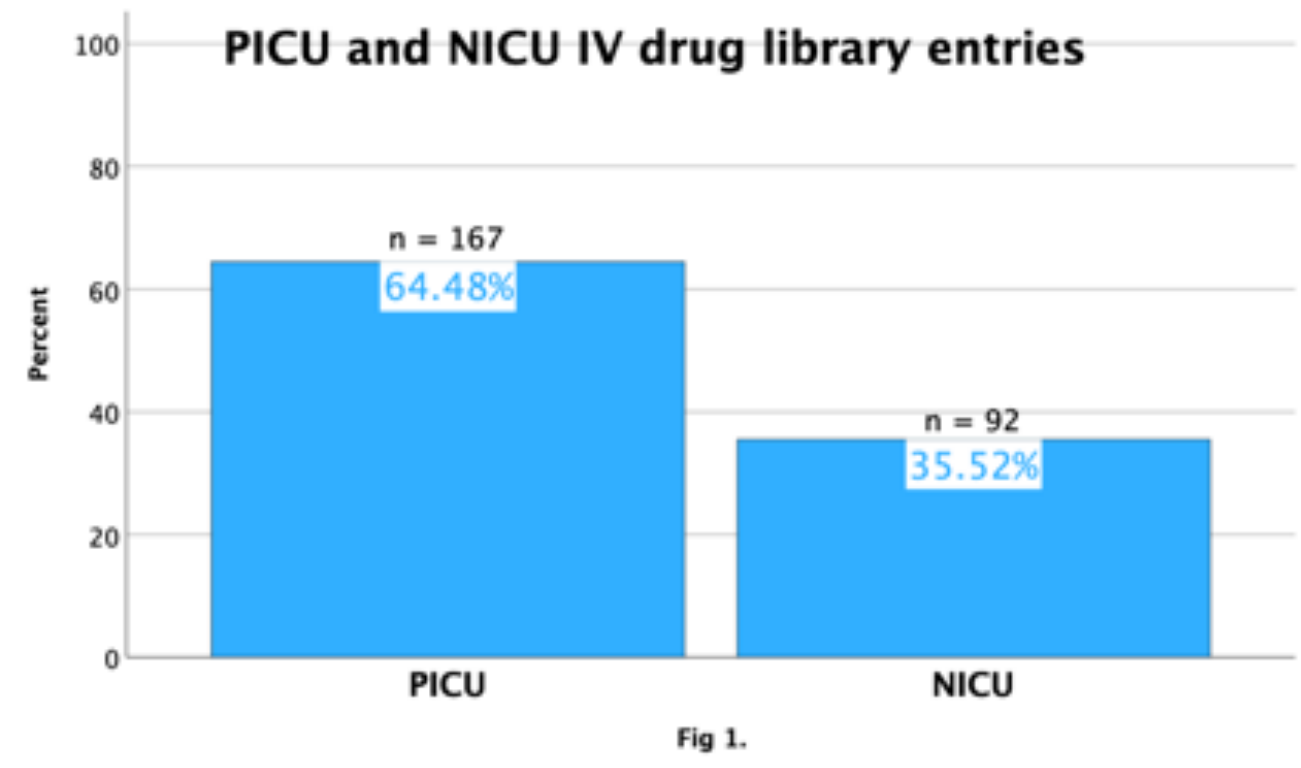
Using SPSS, we collected the following:

- % of drug concentration entries that needed to be updated based on the current recommended standards (vs the % that were currently optimized)
- % of dosing unit entries for PICU continuous IVs that needed to be updated based on the current recommended standards (vs the % that were currently optimized)
- % of "high-risk" drug entries that were identified

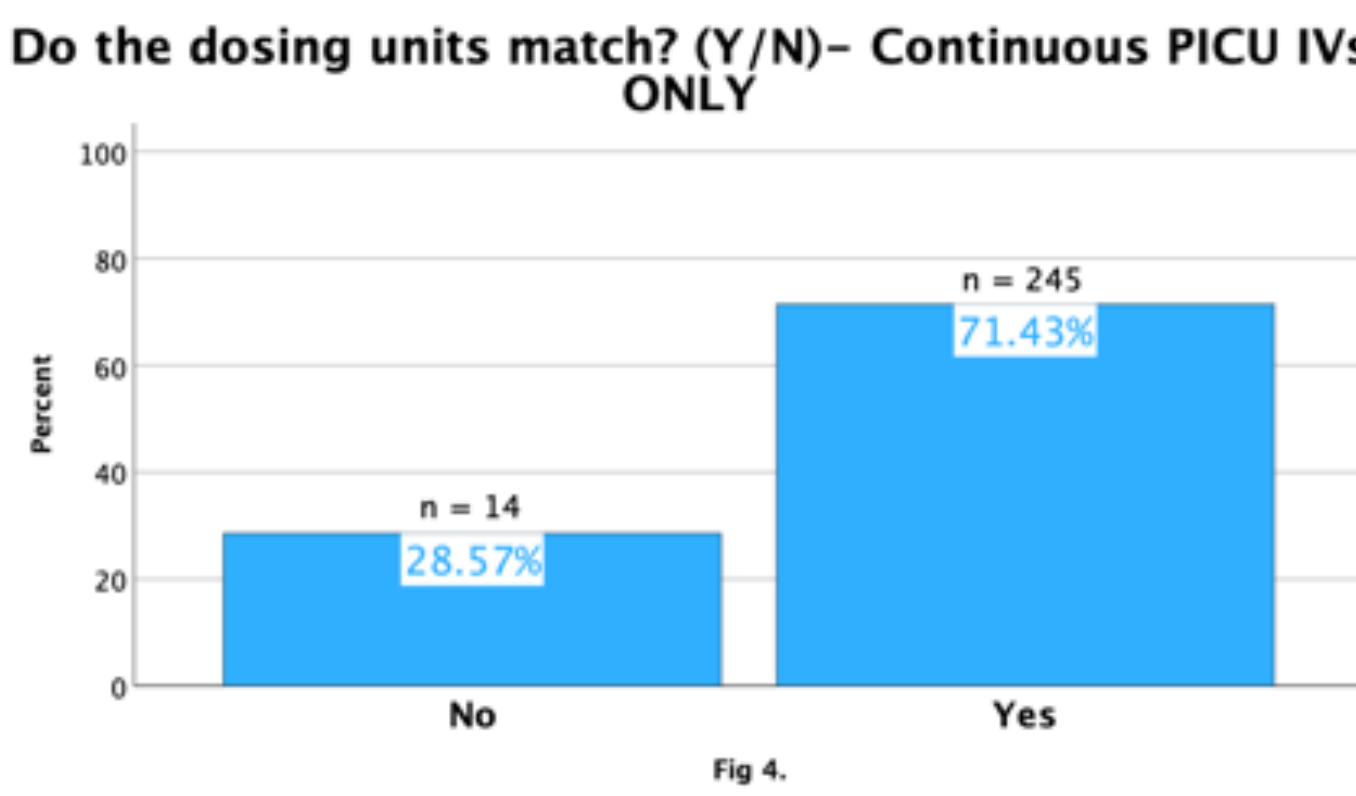
By analyzing these percentages, we will be able to assess the extent of changes since the last update of the standards,

RESULTS

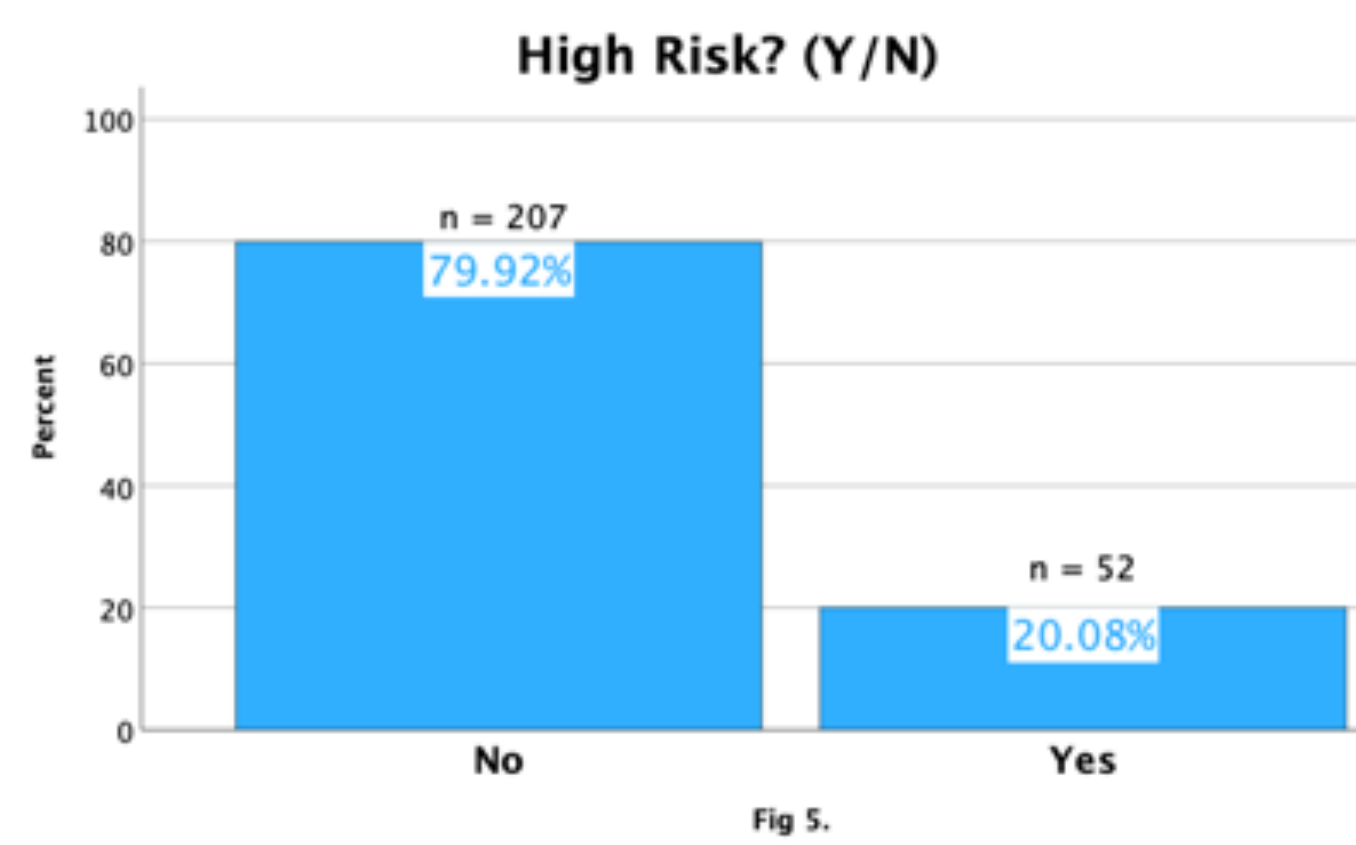
Descriptive Statistics. Fig 1-5



Approximately 90% of drug concentrations needed to be updated.



Approximately 29% of drug dosing units needed to be adjusted. This percentage takes into account only continuous IVs used in the PICU, n= 49. Therefore, the 14 entries that were updated are approximately 5.7% of total number of drugs in the library.



52 high-risk drugs were identified within the library. Modifications to their dosing and duration limits were made.

Bivariate Analysis: Chi-Squared Test.

PICU or NICU Vs. Do the standardized drug concentrations match? (Y/N)			Do the standardized drug concentrations match? (Y/N)		Total	
PICU or NICU			No	Yes		
PICU or NICU	PICU	Count	145	18	163	
		% within PICU or NICU	89.0%	11.0%	100.0%	
		% of Total	56.9%	7.1%	63.9%	
	NICU	Count	85	7	92	
		% within PICU or NICU	92.4%	7.6%	100.0%	
		% of Total	33.3%	2.7%	36.1%	
		Total		230	25	255
				90.2%	9.8%	100.0%

Note: Chi-Square Test provided a p-value of 0.376

Intermittent or Continuous? Vs. Do the standardized drug concentrations match? (Y/N)

			Do the standardized drug concentrations match? (Y/N)				
			No	Yes	Total		
Intermittent or Continuous?	Intermittent	Count	174	9	183		
		% within Intermittent or Continuous?	95.1%	4.9%	100.0%		
		% of Total	68.2%	3.5%	71.8%		
	Continuous	Count	56	16	72		
		% within Intermittent or Continuous?	77.8%	22.2%	100.0%		
		% of Total	22.0%	6.3%	28.2%		
		Total			230	25	255
					90.2%	9.8%	100.0%
			90.2%	9.8%	100.0%		

Note: Chi-Square Test provided a p-value <0.001

DISCUSSION

- We updated 230 out of 259 drug concentrations within the drug library which accounted for approximately 90% of the drugs that were extracted from the database (145 from the PICU library and 85 from the NICU library).
- The intermittent drug libraries were less standardized vs. continuous, and there was no difference in optimization between NICU and PICU libraries
- There were a total of 52 (20%) high-risk drugs identified, which need additional modifications and monitoring to ensure safety in handling and administration.
- We noticed 11 drug entries of LASA (Look-Alike/Sound-Alike) medications, that required updating of tall man lettering. This way of lettering is recommended by ISMP as a safeguard to prevent confusion between two medications that either look-alike, or sound-alike (e.g., predniSONE vs. prednisoLONE).
- These updates are significant and will positively impact patient safety and clinical outcomes.

CONCLUSION

- This quality improvement project aimed to standardize IV drug concentrations in the PICU and NICU at SUNY Downstate Medical Center by aligning our drug library with the latest standards set forth by ASHP, VO, and ISMP to enhance medication safety, reduce errors, and improve patient outcomes.
- The majority of PICU and NICU IV medications required updates based on current standards.
- In the future, it is essential to be vigilant as to when the standards are next updated, so that we can keep up-to-date with the pertinent drug information.
- Medication errors can be reported via KeepSafe. These records should be continuously monitored, and appropriate modifications and safeguards set in place to prevent reoccurrence.
- These efforts will contribute to safer patient outcomes.

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