MSU AGEP Science Today Bulletin

Spring 2026 Edition

Alliance for Graduate Education and the Professoriate (AGEP) Michigan State University Volume 11, Issue1

Letter from the Editors

This past year has been a period of significant transition at Michigan State University.

Our community has navigated the far-reaching effects of federal funding cuts that have impacted many departments and programs across campus. While these events sparked a wide range of emotions, many students–including members of the AGEP community–demonstrated remarkable perseverance in the pursuit of scientific discovery and personal excellence. This year's bulletin is therefore dedicated to recognizing the resilience, dedication and achievements of those who remained committed to advancing aspirations despite these challenges.

For those unfamiliar with our mission, this bulletin serves as a platform for students across diverse disciplines to showcase cutting-edge research, advance their scholarly agendas and highlight their leadership accomplishments. Through these contributions, we celebrate the strength of our multidisciplinary and multicultural community of researchers and scholars working across the Mitten State and beyond.

This year's edition will also include an Alumni Spotlight section, where scholars share insights from different stages of their professional journeys. Through these conversations, the bulletin aims to expand awareness of the many career pathways available to emerging scholars.

We are deeply grateful to our readers and the AGEP community for their continued support. It is with great pride that we present the research, perspectives and accomplishments featured in this edition. Together, these contributions reflect a shared commitment to advancing knowledge and inspiring the next generation of scholars who will continue to inform and inspire our world.

Sincerely,

Charles Whitehead-Tillery, Editor-in-Chief
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Department of Political Science

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An Interrupted Time Series Analysis of COVID-19's Impacts on Non-fatal Shootings, Homicides, and Firearm-related Suicides in Detroit: Research Brief

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Keywords: COVID-19, Homicides, Non-fatal Shootings, Firearm-related suicide.

Introduction

The COVID-19 pandemic had widespread and often harmful effects across the globe. In response, researchers have studied its impact on mental health, education, food security, air pollution, and crime—among other domains. Yet, the pandemic's influence on crime in the US has produced mixed findings. It has been noted that pandemic-related changes in crime were often substantial but differed in both direction and magnitude [1]. For example, homicides and auto thefts increased in many areas, while robbery, larceny and sexual violence declined.

This study uses an Interrupted Time Series Analysis (ITSA) to examine how COVID-19 affected homicides, non-fatal shootings (NFS), and firearm-related suicides, three different forms of firearm violence, in Detroit, Michigan. Two hypotheses guide the study: (1) NFS and homicides will increase at the start of the pandemic due to pandemic-related stressors and decreased opportunities for prosocial economic opportunities, and (2) suicides will increase at the start of the COVID-19 pandemic due to social distancing guidelines, economic instability, and decreased access to mental health resources and social interactions.

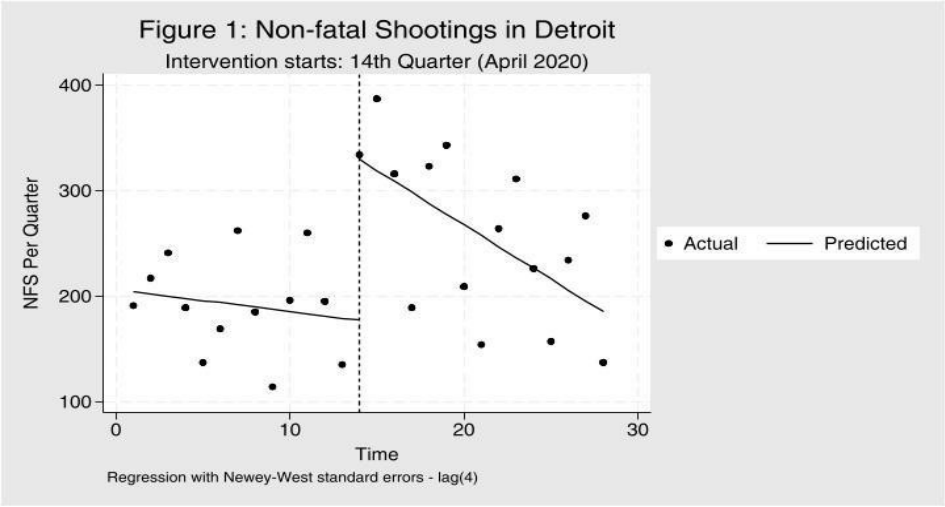
Methods

Incident-level crime data from 2017 through 2023 were obtained from the Detroit Police Department (DPD). The study examined three core outcomes: NFS, homicides, and firearm-related suicides. These outcomes were first recorded at the individual level and then aggregated by quarter across the study period.

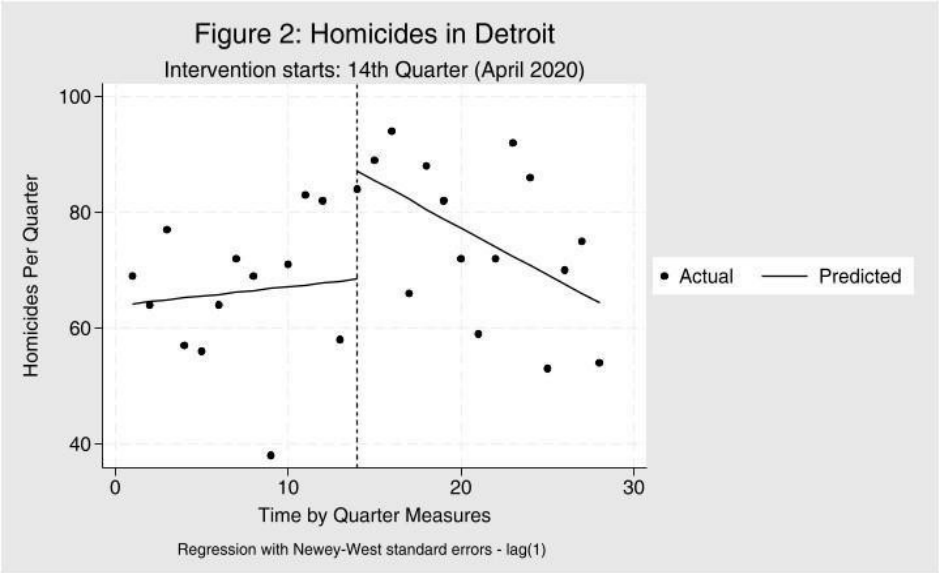
For analysis, an ITSA was conducted separately for NFS, homicides, and firearm-related suicides to determine whether the quarterly frequency of each incident was associated with a significant change at the start of the pandemic and to visualize this change. Within an ITSA, a time series is divided into two or more differing segments. The first segment constitutes a trend before an intervention or interruption, whereas the second is the trend after an intervention or interruption. Segmented regression was then used to estimate changes in both the level and slope of each outcome following the interruption compared to the pre-pandemic trends [4].

Analysis & Results

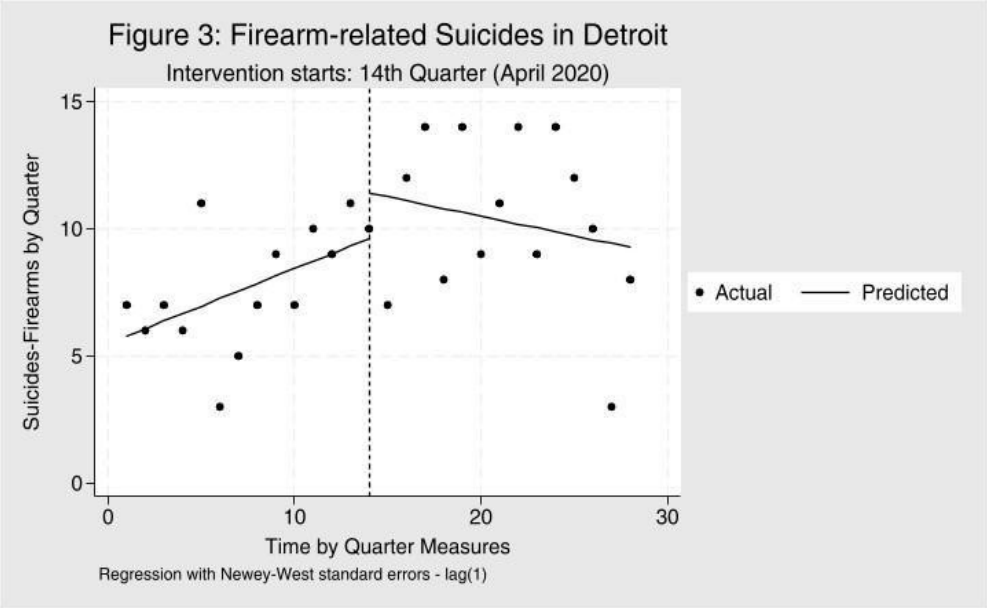
There was a significant increase in NFS during the first full quarter of COVID-19 restrictions. **Figure 1** shows that the quarterly rate of NFS was declining up to the start of the COVID-19 pandemic restrictions. Once the pandemic restrictions started, there was a significant increase in quarterly NFS.



The second ITSA identified a significant increase in quarterly homicides during the first full quarter of the COVID-19 restrictions, followed by a decrease in quarterly homicides. Figure 2 reveals that homicides were on the rise leading up to the COVID-19 pandemic, but there was a significant increase in the first quarter of the pandemic.



Thirdly, there appeared to be no significant increase in the quarterly frequency of firearm-related suicides per quarter. Figure 3 shows that firearm-related suicides were increasing before COVID-19, however, when COVID-19 started, there was not a significant increase in firearm-related suicides.



Why Does This Research Matter?

The findings show that the COVID-19 pandemic was associated with substantial and uneven changes in crime patterns in Detroit. First, NFS and homicides saw a significant increase in occurrence at the height of the COVID-19 pandemic compared to the pre-COVID phase. Secondly, results identified no significant increase in the quarterly frequency of firearm-related suicides at the onset of COVID-19 restrictions. These findings point to important policy considerations for public safety planning during national emergencies and health crises. Across the country and in Detroit, COVID-19 and the pandemic restrictions produced various changes in individual and group behaviors. In future health crises or national emergencies, public officials and policymakers should ensure that communities and individuals have the proper resources and skills to resolve personal and community conflicts peacefully and safely. Policies should be implemented to lessen the impact of economic hardships and stressors caused by these events. Future work should also examine if victim demographics and characteristics shifted during the COVID-19 pandemic.

Firearm violence must be treated as a public health crisis. Treating firearm violence as a public health crisis helps activate a wider range of stakeholders, leverage more resources, and support the implementation of innovative interventions that can inform a more proactive response to gun violence in the U.S. [3,4]. These proactive responses can help ensure that underlying stressors leading to firearm violence and correlates of firearm violence can be addressed, which helps save lives and improve community safety. Ultimately, the U.S. cannot “arrest” its way out of the gun violence problem by relying solely on law enforcement or the criminal justice system to prevent firearm violence. Law enforcement is limited in terms of resources, training, and support needed to support victims, their families, and the larger community. The impacts of firearm violence extend beyond physical injuries and can include emotional and psychological issues. Treating firearm violence as a public health crisis brings together

a wide range of stakeholders and partners who not only work to reduce firearm violence but can also address the various impacts of firearm violence.

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Transmission of Human and Dog-Derived Extended-Spectrum Beta-Lactamase producing Plasmids to commensal gut members

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Keywords: Antibiotic Resistance, ESBL, Community-acquired, Humans, Dogs, Plasmid, Horizontal Gene Transfer

Introduction

The global rise of antibiotic resistance (AR) is largely driven by the overuse and misuse of antibiotics, which allow resistant bacteria to survive and multiply. A major contributor to this problem is the spread of bacteria that produce extended-spectrum β-lactamases (ESBLs), enzymes that break down many commonly used antibiotics—such as penicillins and first-through third-generation cephalosporins—making these drugs ineffective. ESBL-producing infections are estimated to cause nearly 198,000 illnesses and about 9,000 deaths annually [1]. The bacteria *Escherichia coli* (*E. coli*) and *Klebsiella pneumoniae* (*K. pneumoniae*) are the most frequent carriers of ESBL genes and are responsible for many related infections, including urinary tract and lung infections [2].

ESBL genes can spread between bacteria through a process called horizontal gene transfer (HGT), a process in which bacteria share generic material rather than passing it down through inheritance. The most common way this occurs is through conjugation, where small DNA molecules called plasmids move directly from one bacterial cell to another [3]. Many of these plasmids belong to specific incompatibility (Inc) groups, which help classify how they replicate and spread [2, 3)].

While ESBL-producing bacteria were once mainly associated with hospitals, they are increasingly found in community settings [4]. This shift is believed to result from "spillover" between humans, animals, and the environment—especially through close contact with livestock, pets, wildlife, and soil [5–7]. Once these bacteria enter the human body, they can live in the gut, where plasmids easily transfer ESBL genes to normal gut bacteria. Over time, this makes the gut a major reservoir for antibiotic resistance, helping these genes persist, multiply, and spread among different populations.

Methods

We collected six ESBL-producing *E. coli* bacteria strains —three from humans and three from dogs. To examine how resistance genes move between bacteria, we simulated conjugation, a key mechanism of gene spread under controlled laboratory conditions. To do this, we conducted a filter-based conjugation experiment using the human- and dog-derived *E. coli* samples as donor strains—the ones that transfer genes. As recipients—the ones that receive genes—we used an *E. coli* strain originally isolated from a mouse that had been colonized with human gut bacteria. We also included several other types of bacteria commonly found in the human intestine—*E.*

coli MG1655, *Klebsiella pneumoniae*, *Citrobacter rodentium*, and *Salmonella enterica*—to see whether the transferred resistance genes could spread to different gut microbes. The first set of experiments, called the primary transfer, involved testing whether the human- and dog-derived *E. coli* donors could pass ESBL genes to the mouse-derived *E. coli* recipient. The second set, called the secondary transfer, tested whether that newly acquired *E. coli* strain could then pass the resistance genes to other gut bacteria.

Analysis & Results

To determine whether ESBL resistance genes could be transferred to a modified *E. coli* strain and then further spread to other gut bacteria, we performed conjugation experiments under controlled laboratory conditions. The transconjugant frequency—the rate at which gene transfer occurred—was calculated using the formula: Transconjugant colonies / (Transconjugant colonies + Recipient colonies), expressed as T / (T + R). Figure 1 shows that during the primary transfer, human- and dog-derived *E. coli* isolates successfully transferred ESBLs to the mouse-derived *E. coli* strain. The transfer frequency was generally higher for human-derived isolates compared to dog-derived isolates. In the secondary transfer (Figure 2), the ESBL-acquiring mouse-derived *E. coli* strain was able to further transmit ESBL genes to other common gut bacteria, including *Klebsiella pneumoniae*, *Citrobacter rodentium*, *Salmonella enterica*, and *E. coli* MG1655. Transfer frequencies among these recipients ranged from 10^{-1} to 10^{-7}, with *K. pneumoniae* showing the highest average transconjugant frequency.

Figure 1.

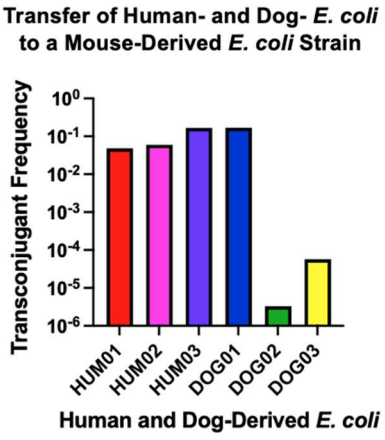
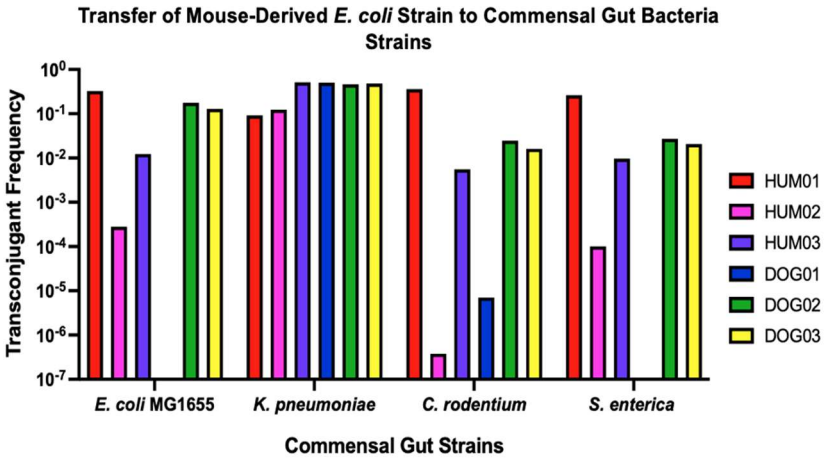


Figure 2.



Why Does This Research Matter?

This study demonstrates that ESBL-producing *E. coli* from both humans and dogs are capable of transferring antibiotic resistance genes to commensal gut bacteria. These findings highlight horizontal gene transfer as a key driver of antimicrobial resistance spread beyond individual hosts and across community associated boundaries. By showing successful transfer between human- and dog-derived strains, this work underscores the interconnected nature of human and companion animal reservoirs. Furthermore, our results reinforce the importance of considering community settings in

antimicrobial resistance surveillance. Collectively, this study advances a One Health perspective, suggesting that dogs may act as reservoirs or intermediates for antibiotic resistance genes that circulate between humans and animals.

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"…sometimes, they just pass me and go to the next person": Assessing the Needs of Black Elementary-Age Children in Mid-Michigan

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Keywords: Child well-being, Black youth, family and community programming, school-based supports, food security, community safety

Introduction

Understanding children's needs is essential for creating environments that support their academic, social, and emotional development [1]. Needs assessments help identify gaps in resources, services, and systems that shape children's well-being and long-term success. For Black children, these needs must be understood within the context of structural inequality and systemic racism, which influence access to education, health, family and community opportunities [2,3]. Efforts to improve outcomes for Black children must therefore address these systemic barriers while also responding to specific needs of local communities [4].

This study examines what Black children ages 5-12 identify as important for their success in their families, schools, and communities. These findings offer actionable insights for practitioners and policymakers seeking to strengthen support systems for Black elementary-aged children in mid-Michigan.

Methods

Thirty-nine Black children (Mage = 7.67 years; 54% girls) participated in the study, with approximately one-third of families reporting household incomes below the federal poverty line. Five focus groups were held in community and school settings across mid-Michigan, where children were asked, "What things do you need from your family, your school, or your community to help you do well?". Caregiver consent and child assent were obtained, and all procedures were approved by the Michigan State University Human Research Protection Program.

Analysis & Results

Children identified various needs across family, school, and community settings to support their success (see Table 1 and Figure 1). Participants shared the importance of supportive family environments and active caregiver involvement, teacher encouragement, and individualized attention in promoting their academic success. Children expressed a desire for safe, respectful school environments and identified bullying as a barrier to their well-being, calling for consistent adult intervention and clear consequences. Children also emphasized the importance of trusted adults and supportive peers for their success. There were children's calls for kindness and nonviolence, alongside references to frequent shootings, reflecting acute awareness of gun violence and its impact on their safety. Lastly, children in this study identified access to food as essential to their well-being and success, highlighting the need to address food insecurity in mid-Michigan [5].

Table 1. Family, School, Community, and Other Needs Expressed by Participants

Setting	Need	Participant Quote
Family	**Positive reinforcement:** Recognition of academic effort through praise and rewards from caregivers.	"So, like when your parents see your report card and you got all 1's and 2's if you like go somewhere fun like Disneyland or something." - Boy, 6 years old
School	**Managing bullying behavior:** Clear school-based prevention and intervention efforts to address harmful behavior.	"They might...a good thing if they're in the same class as you, they might take your desk and move it out to the hallway while they have to think about it. Or they might have an extra desk in the room where the person that was being [mean] has to sit at that desk." - Boy, 6 years old
	Direct teacher support: One-on-one attention, encouragement, and guidance from teachers.	"Things that would help me do well if when I need help I will get help and not get passed by every time a teacher is walking by, and sometimes, they just pass me and go to the next person…" - Girl, 9 years old
Community	**Social support:** Trusted adults and peer support for emotional well-being.	"Someone who directs me and gives me a lot of information on what to do and a lot of clues, a lot of things to help me…someone to sit down and talk for you when you need it." - Girl, 10 years old
	Safety & Kindness: Respectful, safe interactions; opposition to bullying and gun violence.	"…I don't like bullying. It's just not right in the world. It should be kind and loving, and all these shootings, bad." - Boy, 8 years old
Other	**Food:** Reliable access to nutritious food to support well-being.	"…you need healthy food." - Boy, 6 years old

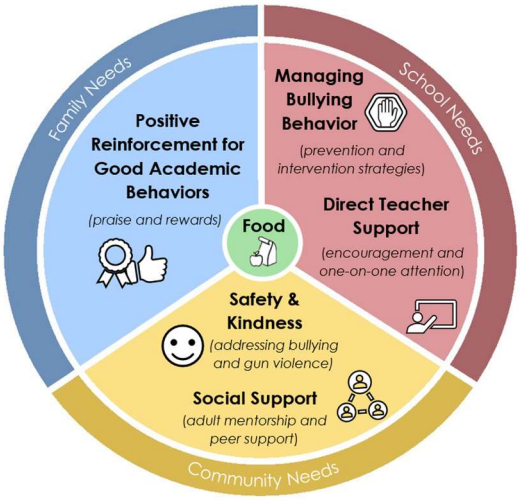

Figure 1. Participants' Needs Across Family, School, and Community Settings

Why Does This Research Matter?

Listening to children's insights into their own needs is essential for designing policies and practices that effectively support their safety, well-being, and opportunities to thrive. Participants' responses highlight the need for:

- Greater caregiver involvement, teacher encouragement, and individualized support in school by **strengthening family–school partnerships which** is important for supporting student learning and well-being.

- Providing a safe, and supportive school climate free from bullying by **implementing bullying prevention programs** in schools to help ensure educators feel equipped to intervene and build positive peer relationships.

- Expanding social support and mentorship from trusted adults by investing in **culturally responsive, community-based mentoring programs for Black youth** in need of friendship and guidance.

- Addressing gun violence by taking coordinated action, which include building **community-based safety initiatives and stronger firearm policies**.

- Providing access to food because **food insecurity is rising and cuts to assistance programs heightens the risk for youth in Michigan**. By ensuring consistent, equitable access to nutritious food for all children, policymakers should prioritize funding initiatives such as **universal school meals, summer and afterschool meal programs, urban agriculture and school/community gardens, as well as community food distribution programs**.

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Urban Pressure at the Tap: How Ethno-racial Identity and Class Shape Drinking Water Quality Inequities and Public Health in Detroit, Michigan

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Keywords: Environmental justice, Drinking water, Lead, Chromium-6, Detroit, Health geography, Urban Geography

Introduction

Detroit's drinking water system reflects overlapping legacies of industrialization, racial segregation, and systemic disinvestment. The city's history as a manufacturing hub has left widespread environmental burdens, including lead and hexavalent chromium (chromium-6) contamination linked to metal-finishing operations and other industrial activities [1-3]. At the same time, discriminatory housing and zoning practices, such as redlining, created stark divisions. Black and low-income neighborhoods have been more likely to endure aging infrastructure, corroded service lines, and weaker environmental enforcement [4,5]. Together, these historical and structural factors have created a water system in which safe drinking water is unevenly distributed across the city, and exposure risks map closely onto racial and socioeconomic lines.

Methods

This study used a case study approach to examine the relationship between Detroit's drinking water infrastructure and health outcomes. The analysis combined archival records, environmental monitoring reports, and publicly available health data. Historical data on infrastructure development and patterns of redlining were integrated with information on contaminant releases, service line composition, and treatment plant service areas from the Environmental Working Group and the Michigan Department of Environment, Great Lakes, and Energy. These data were interpreted alongside toxicological research on lead and chromium-6 exposure to highlight pathways of risk. Finally, health outcome data on kidney disease and invasive cancers from the Michigan Department of Health and Human Services and the National Cancer Institute were reviewed to evaluate whether disease burdens in Detroit align with documented effects of waterborne contaminants.

Analysis & Results

The findings indicate that lead and chromium-6 enter Detroit's drinking water system through distinct yet overlapping pathways. Lead exposure is linked to aging service lines and plumbing installed before the 1950s, with nearly 80,000 known or suspected lead service lines across the city [6]. Although corrosion control treatments are designed to minimize leaching, disruptions in water flow, such as repairs or shutoffs, destabilize these protections and increase the likelihood of contamination [7]. These vulnerabilities are especially pronounced in older, lower-income neighborhoods that experience more frequent service interruptions and in which residents lack the financial means to replace pipes or purchase filtration systems [8].

Chromium-6 exposure, by contrast, is associated with Detroit's industrial legacy. Facilities such as BASF Wyandotte have released chromium-6 into the Detroit River, which flows into Lake Erie, the source of the Southwest Water Treatment Plant [2,3,9]. This plant serves specific neighborhoods, resulting in exposure risks that are geographically uneven across the metropolitan area [4]. The absence of a federal maximum contaminant level for chromium-6 further compounds risks, as there is no enforceable national standard to protect residents from chronic low-level ingestion [10,11].

Public health data from Detroit show patterns that warrant attention to these risks. In 2023, the city reported an age-adjusted kidney disease mortality rate of 23.5 per 100,000 residents, compared to a statewide average of 14.3 [12,13]. Between 2017 and 2021, Detroit's cancer incidence rate was 479.0 per 100,000, also higher than the state average of 441.4 per 100,000 [14]. Common cancers in the city include prostate, breast, lung, colon, and bladder cancers, which align with those associated with lead and chromium-6 exposure [14]. While these findings do not establish a direct causal relationship, the overlap between documented environmental risks and observed health disparities underscores the importance of continued investigation into how infrastructure conditions and historical inequities may shape long-term health outcomes in Detroit.

Broader Implications

In the future, I plan to integrate environmental data with spatially detailed health outcomes to more directly examine associations between contamination and disease. This includes mapping kidney disease and cancer incidence by race, ethnicity, and socioeconomic status in relation to drinking water intake service areas and industrial contamination sites. I also plan to apply multivariate statistical modeling to control for confounding factors, such as age, smoking, diet, and other comorbidities, while quantifying the proportion of the observed disease burden attributable to contaminant exposure.

The case of Detroit makes clear that inequities in drinking water quality are not simply the result of aging pipes or inadequate regulation, but also the outcome of decades of racialized disinvestment, industrial pollution, and political neglect. Policymakers must therefore recognize contaminated water as both a public health and a civil rights issue, where failure to act perpetuates cycles of illness, mistrust, and inequality. Addressing these disparities requires enforceable federal standards for chromium-6 and stronger protections against lead, alongside funding frameworks that prioritize vulnerable neighborhoods rather than those with greater political or economic influence.

Why Does This Research Matter?

Repeated exposure concerns and uneven protections can increase long-term disease burden while deepening mistrust in the institutions responsible for public health. Treating water contamination as both a public health and an environmental justice issue supports policy shifts toward targeted investments in neighborhoods bearing the greatest burden. Findings from Detroit can inform action in other U.S. cities with similar

industrial histories by showing how place, race, and class shape exposure and how prevention can be geographically and socially specific.

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From Bench to Bedside: Leveraging GILZ as a Potential Biomarker

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Keywords: Cancer, Inflammation, Tumor Microenvironment

Introduction

Breast cancer is the second leading cause of death in American women, with 1 in 8 expected to have the disease in their lifetime. Triple Negative Breast cancer (TNBC) is known to be the most aggressive subtype, being very resistant to treatment and prone to high rates of inflammation. Chronic inflammation in tumor cells can increase the risk of tumor growth, metastasis, and low oxygen conditions that can create severe immune responses. When this subtype of breast cancer metastasizes to any other tissue in the body, survival rates become as low as 12% [1].

The lack of sustainable treatment options for TNBC patients has created the need to look at new potential biomarkers to target. This project investigates the role of the Glucocorticoid-Induced Leucine Zipper (GILZ) protein in regulating inflammation that is enhanced by low-oxygen. This protein acts on inflammation and cell proliferation markers to prevent inflammatory responses in disease [2]. High GILZ expression in TNBC patients is correlated to longer survival and is hypothesized to reduce overall inflammation in tumors [3].

Overall, this study aims to:

1) Alter the expression of the GILZ protein using chemical compounds.
2) Investigate the molecular relationships with other biomolecules in normal and low-oxygen environments
3) Assess if changing expression changes tumor cell growth patterns in these altered environments.

Methods

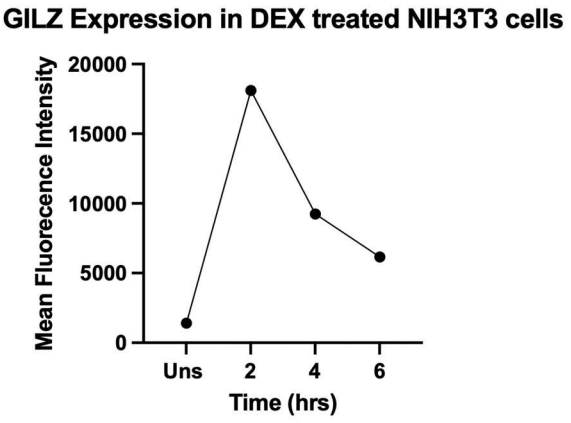
Mouse TNBC cells were treated with a stimulant for GILZ expression for 2, 4 and 6 hours under controlled laboratory conditions. TNBC cells included in this assay were both metastatic TNBC and non-metastatic cell lines. Flow cytometry identified GILZ protein expression level via fluorescence changes over time to confirm the degradation rate of 2 hours (Ronchetti et al, 2015). Treatment with a chemical, low oxygen (hypoxia) stimulation at varying concentrations was used to induce and test the expression of a primary inflammation immune marker for further analysis. These experiments will be repeated and undergo genetic analysis for quantification of protein expression.

TNBC cells were genetically altered to over-express the GILZ gene, merged to a green fluorescent gene that allows the cells to appear visibly green under a microscope for expression confirmation. These cells will be used in a compound interaction analysis to determine if drugs can change how this protein is expressed for potential therapeutic development. Protein interaction analysis will also confirm whether GILZ binding changes in low oxygen conditions. Lastly, cell growth assays in TNBC cells with altered GILZ expression in normal and low-oxygen conditions will display whether modulated expression can influence growth and proliferation patterns.

Analysis & Results

TNBC cells and normal mouse fibroblasts treated with a glucocorticoid to induce GILZ expression were both found to have lower expression every two hours when analyzed via flow cytometry. When these same cell lines were treated with a hypoxia-inducing agent (deferoxamine), it was found that each cell line peaks in hypoxia immune markers at different concentrations and times. This may suggest that in differing TMEs, the threshold for low oxygen is varied, and thus influences inflammation differently. A chemical compound interaction assay will determine if any compounds can alter GILZ expression in cell culture. Analysis will display whether a drug can increase or decrease GILZ expression, determining its chance at potential use for modulation in future experiments. If compounds are found to successfully alter expression of GILZ, they will be used to target modulation in determining protein-protein interactions. In the protein interaction analysis assessing the binding partners of GILZ in varying oxygen conditions, we expect to see that GILZ protein binding partners in hypoxic TNBC cells will be different. These compounds will also be used to alter expression of GILZ in cell lines to observe whether changes in expression affect cell growth and proliferation patterns in different cell growth assays.

A)



B)

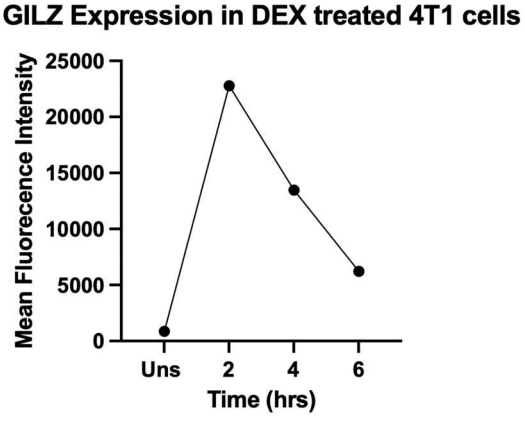


Figure 1: Mean fluorescence of cells treated with a stimulant (dexamethasone) to induce GILZ expression over 6 hours. **A)** NIH3T3 fibroblast cells (normal cells) **B)** 4T1 TNBC cells.

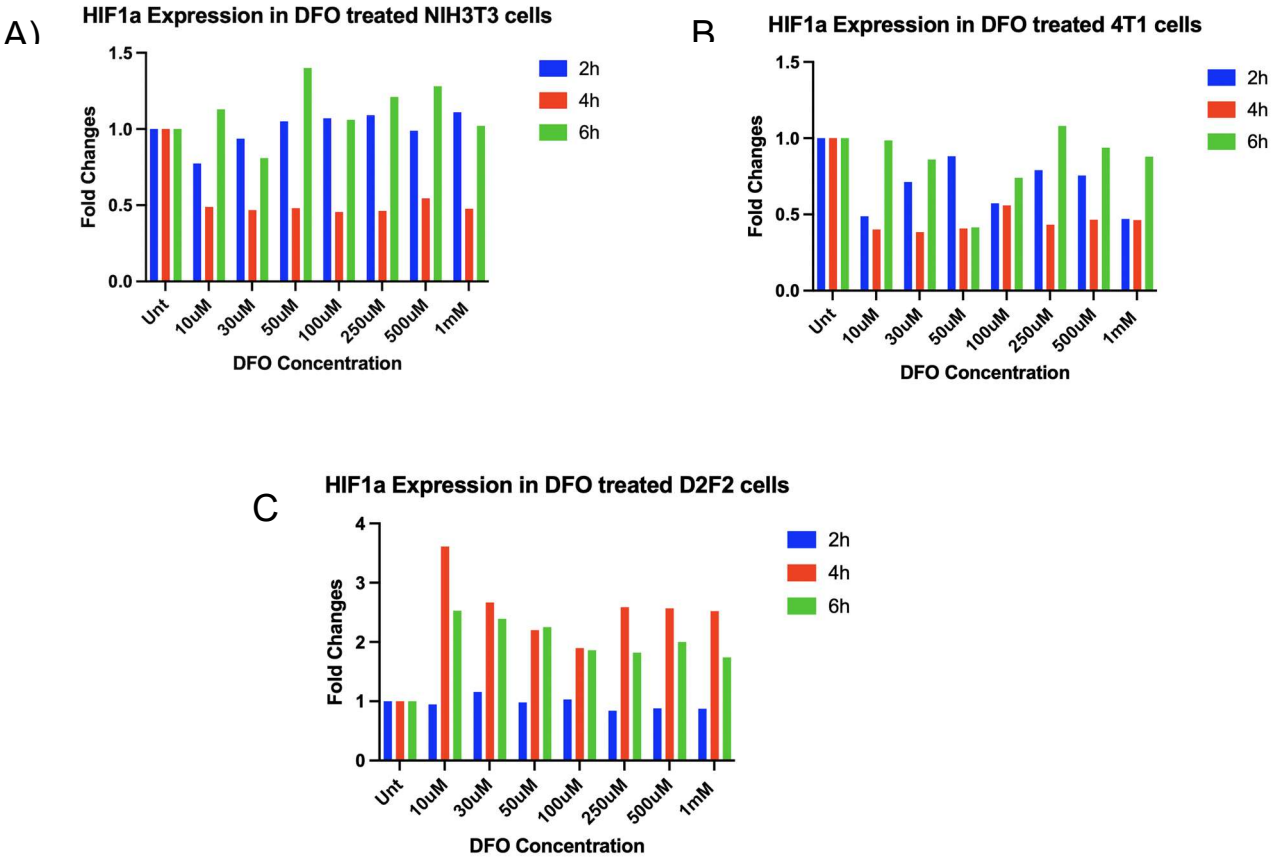


Figure 2: Fold change differences in expression of a low-oxygen immune marker (HIF1a) over 6 hours after treating with deferoxamine (DFO) in **A)** NIH3T3 fibroblast cells (normal cells) **B)** D2F2 non-metastatic TNBC cells and **C)** 4T1 metastatic TNBC cells.

Future Directions

As this study is ongoing, preliminary experiments that were done to confirm GILZ expression will be redone for quantification utilizing DNA detection techniques. Hypoxia induction will be repeated using a low oxygenated air mixture in a controlled incubator to understand what chemical concentration correlates to similar inflammation marker expression. Cells are being properly stored to complete the drug interaction analysis, and cell growth assays will commence after hypoxia assays are complete.

Why Does This Research Matter?

1. **Many women with breast cancer die each year**
   Over 42,000 women are expected to die from breast cancer in 2026 alone (ACS, 2026). While there are many treatments for some subtypes, TNBC claims the lives of many young women under age 40 with little options. GILZ provides a treatment option that avoids glucocorticoid toxicity and targets specific immune mechanisms.

2. **Increased & improved inflammatory disease treatment**

The GILZ protein is naturally expressed by the average person at any point in their lifetime. This, paired with its heavy involvement in immune regulation, gives it great bandwidth for use in mitigating inflammation in cancer and other inflammatory diseases.

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Beyond the Lecture: Using Theater to Reduce COVID-19 Vaccine Hesitancy Among HBCU Students

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Keywords: COVID-19 Vaccine Hesitancy; HBCU Students; Ethnodrama; Health Education

Introduction

COVID-19 has infected more than 92 million people in the United States, contributing to high rates of infection, hospitalization, and deaths, heavily impacting African-American communities [1]. Representing approximately 13% of the U.S. population, African-Americans were reported to have higher rates in COVID-19 vaccine hesitancy than any other racial and ethnic groups [2]. Research consistently shows that this hesitancy is not due to lack of information but rather reflects historical and contemporary mistrust of medical institutions, shaped by experiences such as unethical medical experimentation, systemic racism, and unequal access to care [3].

In response, public health scholars have increasingly emphasized the importance of culturally responsive and participatory health communication. Theater-based health education, often referred to as ethnodrama, has emerged as an innovative strategy that centers storytelling, emotion, and dialogue. Prior studies demonstrate that ethnodrama can increase health knowledge, reduce stigma, and promote behavior change in African American communities by allowing audiences to see their lived experiences reflected on stage [4]. However, limited research has directly compared theater-based interventions to standard lecture formats among young adult populations, particularly within HBCU settings. Therefore, the objective of this research was to determine whether culturally relevant health education, specifically theater-based interventions (ethnodrama), is more effective than traditional lecture-based education in reducing COVID-19 vaccine hesitancy among Historically Black College and University (HBCU) students.

Research Questions

This study was guided by two primary research questions:

1. What are the effects of theater (ethnodrama) on reducing COVID-19 vaccine hesitancy among HBCU students?
2. What are the effects of a theater (ethnodrama) when compared to a standard lecture on reducing COVID-19 vaccine hesitancy among HBCU students?

Methods

A two-group pre-test/post-test design was used to evaluate changes in COVID-19 vaccine hesitancy following participation in either a standard lecture or an ethnodrama intervention. Participants were HBCU college students (n=53) recruited from undergraduate courses with faculty permission. This study was also reviewed and approved by the North Carolina Central University Institutional Review Board (IRB #1201642).

Before the intervention, participants completed a survey assessing demographic characteristics, COVID-19 vaccine knowledge, attitudes, and internalized stigma related to vaccination. Participants then attended either a traditional lecture on COVID-19 vaccines or a theater-based intervention (*The Right Right Now Show*), which presented vaccine-related themes through storytelling and performance. Following the intervention, participants completed a post-test survey measuring the same outcomes.

To examine within-group changes in vaccine hesitancy from pre- to post-intervention, we performed non-parametric Wilcoxon signed-rank tests since the data did not meet the assumption of normality.

Analysis & Results

Results indicated that both interventions were effective in significantly reducing COVID-19 vaccine hesitancy among HBCU students. Wilcoxon signed-rank tests for lecture participants (n=19) lowered from a median 110 to 89 ($p < .001$). Similarly, participants in the ethnodrama group (n=34) showed a significant reduction in vaccine hesitancy after the theater-based experience (Mdn=110 pre to 86.5 post, $p < .001$). There was potential evidence of ethnodramas being more effective than traditional lectures but not statistically significant.

These findings suggest that structured educational interventions when delivered in an accessible and engaging way can positively influence vaccine perception among young adults. Importantly, the strong impact observed in the ethnodrama group supports existing literature that emphasizes the value of culturally grounded, experiential approaches for addressing mistrust and stigma.

Limitations

Limitations should be noted. Self-reported measures are subject to social desirability bias. The design did not include random assignments of intervention groups. Additionally, results may not be generalizable beyond HBCU student populations.

Future Research Directions

Future research should examine the long-term effects of ethnodrama on vaccine confidence and health decision-making, explore how theater-based interventions influence trust in medical institutions, and assess the scalability of these approaches across multiple campuses and health topics. Comparative studies that examine effect sizes across intervention types and incorporate qualitative data could further illuminate how and why theater-based education works.

Why Does This Research Matter?

This research contributes to a growing body of evidence suggesting that vaccine confidence is shaped not only by information, but by trust, cultural relevance and emotional connection. By situating ethnodrama within HBCU settings, this study highlights the potential of theater-based health education as a meaningful complement to traditional public health strategies. As public health continues to address vaccine hesitancy and other health inequities, approaches like ethnodrama that reflect culture and lived experience may offer a meaningful way forward. This research was supported in part by the Research Centers in Minority Institutions (RCMI) grant U54MD012392 and Duke CTSI

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The Role of Sports in the Development of Youth Entrepreneurial Mindsets

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Keywords: Sport, Participation, Youth Development, Life Skills, Leadership

Introduction

Positive Youth Development (PYD) research consistently suggests that in addition to improved physical skills, sport participation also improves essential life skills. Life skills that can be developed through sport include but are not limited to leadership, problem-solving, time management, and goal setting [1]. These skills are transferable to other life domains and should be utilized beyond sport participation. Youth athletics possess a unique window of opportunity to create foundational growth that is physical and psychological, hence the importance of youth sport participation.

Research has shown entrepreneurial mindsets are also developed through sport participation [2]. Like essential life skills, enterprising tendencies are foundational assets of youth sport. The entrepreneurial mindset is a shared one, made up of several enterprising tendencies: the need for autonomy, need for achievement, calculated risk-taking, creative tendency, and locus of control [3]. Under the belief that life skills and enterprising tendencies are foundational assets of youth sport participation, it is unfortunate there is no established research evidence on relationships between life skills and enterprising tendencies. The purpose of this cross-sectional, secondary research study is to identify relationships that exist between life skills and the five enterprising tendencies, as well as explain the importance of these relationships regarding youth sport participation and development.

Methods

A total of 146 youth, aged 12-20 years from three African countries (Botswana, Ghana, Tanzania) completed the Life Skill Scale for Sport (LSSS) and the General Measures of Enterprising Tendencies test (GET2). The LSSS is a 5-point Likert scale that measures participants' self-perception of growth in a skill [1]. The GET2 is a 54-question test meant to measure a person's potential as an entrepreneur [3]. A demographic questionnaire was also administered to acquire descriptive statistics such as age, sex, education level, sport type, sport participation frequency/duration, etc. Data secured from Malete et al., 2022, were entered into SPSS for analysis. In the first analysis, correlation coefficients and their significance were found (*CI = 95%).* Afterwards, a regression analysis was used to test if any life skills were significant predictors of enterprising tendencies.

Analysis & Results

Leadership and goal setting emerged as the only skills that significantly correlate to an enterprising tendency, with both skills correlating to calculated risk-taking ($p = .028$), ($p = .022$). Regression analyses then revealed leadership as the only life skill to significantly predict an enterprising tendency, which was also calculated risk taking (*B*

= *0.919, p = .015)*. Lastly and most unexpected, all life skills examined negatively and significantly correlated to the need for autonomy.

Table 1: Correlation Coefficients of Life Skills and Enterprising Tendencies

Variable	Correlation and Significance	Leadership	Goal Setting	Problem Solving/Decision Making	Time Management
Need for Achievement	Correlation	.068	.141	.118	.096
	Sig.	.419	.091	.158	.248
Need for Autonomy	Correlation	-.179	-.166	-.175	–.184
	Sig.	**.031**	**.046**	**.035**	**.027**
Creative Tendency	Correlation	-.030	.047	.020	-.037
	Sig.	.720	.576	.815	.663
Locus of Control	Correlation	-.161	-.044	-.145	-.066
	Sig.	.053	.599	.082	.428
Calculated Risk Taking	Correlation	.183	.190	.140	.086
	Sig.	**.028**	**.022**	.093	.302

Table 2: Regression Analysis

Variables	*B*	*p*-value
Need for Autonomy		
Leadership	-.188	.439
Time Management	-.037	.872
Problem solving and decision making	-.019	.993
Goal Setting	.011	.969
Calculated Risk Taking		
Leadership	.919	**.015**
Time Management	-.204	.565

Why Does This Research Matter?

Findings suggest there are significant relationships between life skills and enterprising tendencies. All positively significant relationships correlated life skills (leadership and goal setting) to calculated risk-taking. Goal setting is significantly correlated, but the presence of leadership significantly predicts someone who takes calculated risks. Therefore, taking calculated risks could be considered a character trait of leadership, which is immensely important in youth development. These findings suggest that leadership training simultaneously develops risk-taking skills. Being that these skills and tendencies have been proven to be transferable beyond sport environments, improving upon them at a foundational age sets up future success for youth in an interdisciplinary manner. Considering this, sport participation should be used as a tool for youth development given its rare level of transferability and foundational importance.

Findings also create a distinctive narrative with all examined life skills being negatively correlated with the need for autonomy. After lab discussion, these findings highlight cultural differences in essential life skills and enterprising tendencies. The study's sample comes from a more collectivist culture as opposed to a more Western, individualistic culture. The need for autonomy may not be valued as highly in collectivist cultures. Ultimately, this would challenge Caird's (2013) definition of an entrepreneurial mindset, suggesting the need for autonomy is not required.

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The Influence of Isoflurane on the Gut Microbiome in a Rat Model of Diet-Induced Hypertension

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Keywords: Cardiovascular disease, hypertension, isoflurane, Gut microbiome

Introduction

Hypertension (HTN), commonly known as high blood pressure (BP), is a major risk factor for cardiovascular disease. According to the CDC, one of the leading causes of death in the United States. Dysbiosis, an imbalance in the human gut microbiome, can induce systemic inflammation and disrupt intestinal mechanotransduction, the event that consists of the conversion of mechanical signals into biochemical signals, a process involved in BP regulation [1]. While genetics play a role in the development of HTN, there are different factors that affect the gut microbiome leading to dysbiosis such as diets and exposure to drugs [2]. Isoflurane, a commonly used anesthetic agent for maintaining general anesthesia, has known effects on BP regulation. Previous studies in my lab suggested that isoflurane may also alter diet-induced HTN. However, the interaction between repeated isoflurane exposure, diet-induced microbiome changes, and HTN remains poorly understood. In this study, we evaluate the effects of both diet and repeated isoflurane anesthesia on the gut microbiome and associated differences in BP. We hypothesize that isoflurane reduces high-fat diet-induced hypertension by changing the composition of the gut microbiome

Methods

A total of 36 Dahl salt-sensitive (SS) rats were used in this study and divided into two cohorts: control diet (CD; 10% kcal from fat) (n=18) and high fat diet (HFD; 60% kcal from fat) (n=18). Additionally, half of the rats (n=9CD and 9HFD) were exposed to isoflurane every two weeks for 24 weeks of high-frequency ultrasound imaging procedures, resulting in 12 total isoflurane exposures per rat. Arterial BP was measured continuously by implanted radiotelemetry or tail cuff plethysmography. To evaluate changes to the microbiome, we collected fecal pellets and analyzed them by shallow shotgun whole genome sequencing. Fecal pellets were collected and analyzed at week 0, and 10, 17, and 24 for diet variables.

Analysis & Results

Consistent with prior research, our findings demonstrated that diet plays a role in driving changes in the gut microbiome, which is associated with the development of HTN [3]. Rats fed a HFD exhibited altered microbial composition and diversity compared to a CD, associated with elevated BP. Our results found no significant link between isoflurane exposure and changes in the gut microbiome.

Blood Pressure

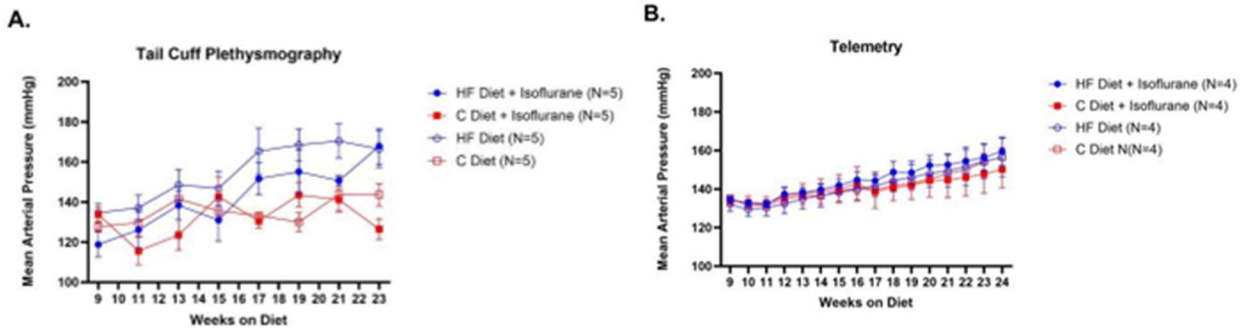
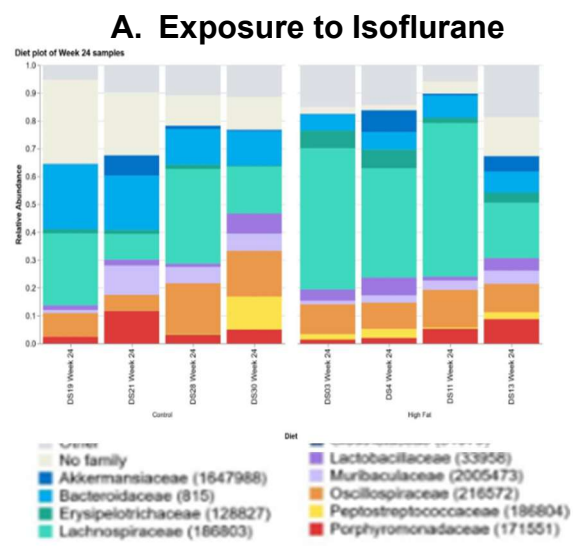


Fig.1. Mean Arterial Blood Pressure in High-Fat Fed and Control Fed Animals. Arterial blood pressure was monitored (A) weekly using noninvasive tail-cuff plethysmography or (B) continuously using implanted radiotelemeters. Data were analyzed by two-way repeated measure ANOVA to compare the difference between *groups. No statistically significant differences were detected.*

Top 10 family composition



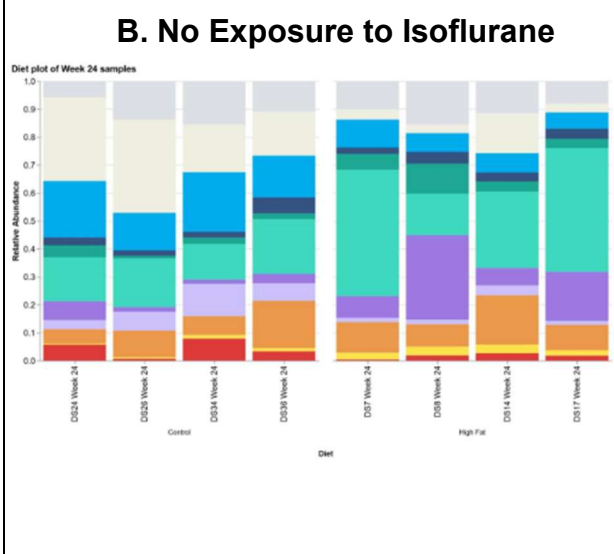


Fig 2. Top 10 Taxonomic Classifications (Family) Between Control and High-Fat Fed Rats at 24 Weeks. (A) Data from rats exposed to isoflurane, (B) data from rats with no exposure to isoflurane. There were no significant differences in the relative abundance of bacteria in the gut microbiome of the groups treated with isoflurane

Future Work

We will identify specific bacterial taxonomy classification associated with observed effects between control diet and high-fat diet. In addition, we will expand the study to include female Dahl SS rats, since we want to see if there is a difference between the sex.

Why Does This Research Matter?
The implications of this work extend beyond animal research. As medical procedures requiring anesthesia are common, particularly among individuals with metabolic disease or cardiovascular risk, understanding the impact of diet on the microbiome is crucial for hypertension research. Diet-induced changes in microbial composition can directly impact BP regulation, and repeated exposure to isoflurane can alter the gut microbiome, influencing the development of HTN. These data could shift how we approach the management of hypertensive patients by encouraging more personalized dietary interventions and reconsidering the type or frequency of anesthetic use in individuals at risk.

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Evaluating the Utility of the Family Nutrition and Physical Activity Screening Tool for Predicting Childhood Obesity

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Keywords: Obesity, nutrition, physical activity, child health

Introduction

Childhood obesity can lead to long-term health consequences (e.g., type 2 diabetes, cardiovascular disease) [1]. According to the CDC, as of 2020, about 19.7% of the child and adolescent population was classified as obese, which raises an even more serious problem. Early identification of at-risk children is critical for implementing timely and effective preventive interventions. It is currently unclear how the home environment affects children's health behaviors related to obesity [2]. Furthermore, healthcare clinics lack standardized tools to measure obesity risk factors in the home [3]. This study aimed to identify home environment risk factors related to children's health behaviors using a clinical screening tool.

Research Questions

What is the association between Family Nutrition and Physical Activity (FNPA) risk scores and Childhood obesity?

Methods

We hypothesized that higher FNPA scores are associated with decreased BMI in children. In this cross-sectional study, we chose the FNPA as it gives a clear and comprehensive image of how the home environment affects children's health. We gathered data from the Archive for Research in Child Health (ARCH), a prospective pregnancy cohort in Lansing, Michigan. FNPA scores of 52 children aged 4-6 and 35 children aged 10-12 were assessed by 10 subdomains of family routines and behaviors on a four-point ordinal scale of never to always. Higher scores indicate healthier environments. Researchers also gathered each child's height and weight using standard tools, and BMI was calculated using the following equation: $weight/(height)^2$.Linear regression models were used to evaluate associations between FNPA subscores (overall and by subdomain) and child BMI, adjusting for age, sex, and race at BMI assessment.

Analysis & Results

After analysis, in the 4-6 age group, we found a significant association in the child activity subscore. In the age group of 10-12, we found a significance in the healthy environment and the overall FNPA scores. These findings suggest that parents can help prevent their child from becoming obese by being active with their children, signing them up for sports, and limiting screen time in the child's bedroom.

Why Does This Research Matter?

Unlike previous research that focused on three domains (physical activity, food choices, and screen time), our study incorporated 10 domains, providing a more comprehensive picture of the home environment's role in childhood obesity. By identifying specific home-based risk factors, this study supports integrating family-centered risk assessments into pediatric primary care. These efforts represent an important step toward shaping policies that promote early prevention of childhood obesity.

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AGEP Faculty Alumni Spotlight
A Conversation with Dr. Erika Vallejo

By Raymundo Lopez
Department of Political Science, Michigan State University

Dr. Erika Vallejo is an Assistant Professor in the Department of Political Science at The College of Wooster. A former leader and member of the AGEP community (2021 to 2025), she completed her doctorate at Michigan State University with specializations in American politics and public policy. Dr. Vallejo's research examines how race, ethnicity, gender and class intersect to shape access to elected office and perceptions of political legitimacy.

Question 1: Tell us something about your research, what are you trying to answer and why does it matter for how we understand the world today?

EV: For my research broadly, I am interested in the intersection of working-class status, race and gender. What I am trying to understand is whether underrepresentation is amplified for working class people of color and women of color. In my ongoing project, I am observing that women of color are less likely to run for office. Beyond regression models, interviews and other qualitative work allow me to talk to them [candidates] about the barriers that they face. This approach also helps us understand how barriers are also amplified.

Question 2: How did you go about building your support system during your graduate journey at Michigan State?

EV: I would say that AGEP was absolutely a large part of it. Being able to have that space with other students of color who were also undergoing a PhD program was really helpful because I made a lot of good friends there. And being in those positive spaces where [I still remember at the end] they would always ask us about something we accomplished. I think having those positive atmospheres was super helpful.

Question 3: Is there a moment or experience from your time in AGEP that still resonates with you today?

EV: I think it's hard to choose one. One thing that stands out to me from the get-go was ending those [AGEP Community] meetings in a really positive way—hearing about everyone's accomplishments even though we were all from different departments. For me that always stood out; it is something I still think about today. I also really valued the SROP talks because we were able to talk about our research in a space where we feel a little bit more accepted […] or even just getting questions from people that are not necessarily from your discipline to get you to think about questions that you've never thought about before.

Question 4: Many students wonder what life "after a PhD"" really looks like. How has your experience been in your current role at Wooster College?

EV: In many ways it is very different. I remember the saying "You have so much time to read in graduate school that you're not gonna have as a professor, so take advantage of it," I do think that that saying is absolutely accurate. For myself, at least, having had a full-time job before I went to graduate school helped me in a lot of ways. When you're in graduate school, you're with other grad students in your department, you're interacting with people. Not that you don't do that here [as a professor] but it is a little bit more isolating because you're doing work in your own office. So, I think that for me it was a little bit more of a transition. But I do think there are parallels from graduate school to being a professor.

Question 5: If you could offer one piece of advice to current graduate students, what would it be?

EV: Based on my own experience, a piece of advice I would have, I know how exhausting it can get in those last 2 years—especially when you're not taking any classes anymore and are just focused on research and writing. I had a lot of moments where I tried to put it off as much as possible, it got stressful for me and exhausting. So don't procrastinate. If I could add to that, try not to focus on writing a perfect dissertation. Try to do two pages a day. What matters is getting it done and getting that degree. In research, there will always be limitations so be comfortable with that.

What is MSU SROP?

The Summer Research Opportunities Program (SROP) is a gateway to graduate education at Big Ten Academic Alliance universities.

The goal of the program is to increase the number of underrepresented students who pursue graduate study and research careers. SROP helps prepare undergraduates for graduate study through intensive research experiences with faculty mentors and enrichment activities.

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The MSU SROP Program provides an opportunity to combine professional development with applied work experience in your career field. This is also an opportunity for Michigan State University faculty to evaluate you as a potential graduate student. MSU SROP typically convenes the third weekend of May and ends in the last weekend of July.

Program Benefits

- An opportunity to conduct research at one of the country's largest and most scenic academic research universities
- A generous stipend for the summer
- Free room and board on MSU's campus
- Paid travel to/from East Lansing
- Opportunities to present research locally and regionally
- An opportunity to interact with successful role models who have earned advanced degrees

Eligibility and How to Apply

- U.S. citizen or permanent resident
- Enrolled in a degree-granting program at a college/university in the U.S.
- Cumulative GPA of 3.0 or higher
- Have completed at least 2 semesters of undergraduate education
- Demonstrate a strong interest in graduate study (Masters or Ph.D.)

For more information

Please write to us at: msusrop@grd.msu.edu

Visit us online at: http://www.grad.msu.edu/SROP

MSU AGEP: MSU's premier graduate education learning community for diversity, equity and inclusion

Are you a student or faculty member at MSU and want to join the AGEP Learning Community ?

facebook.com/msuagep

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Follow **#MSUAGEPSSC** and capture highlights during the conference!

MSU GRADUATE SCHOOL

MICHIGAN STATE UNIVERSITY

What is AGEP

The Alliances for Graduate Education and the Professoriate **(AGEP)** is a National Science Foundation program that supports recruitment, retention, and graduation of underrepresented U. S. minorities in doctoral programs of the natural and social sciences, mathematics, and engineering. Undergraduates, graduate students, post-docs, and faculty who participate in building the AGEP Community at MSU rise to meet the challenge of Diversity, Equity & Inclusion (DEI) at U. S. colleges and universities, by nurturing and developing world-class STEM and Social, Behavioral and Economic (SBE) sciences faculty members who fully reflect the diversity in race, gender, culture and intellectual talent of the U. S. population.

National Need

The United States faces a growing demand for a highly educated science and engineering workforce. The annual number of Black, Hispanic, and American Indian citizens earning a PhD must quadruple in order to contribute the science and engineering talent necessary for the U.S. to become self-reliant.

AGEP at Michigan State University – Impact

The MSU AGEP Community represents 75% of doctoral students at MSU who are Black, Hispanic or American Indian citizens that in NSF sponsored departments. Ninety percent of the AGEP Community graduate student participants complete an advanced degree. Over the past 10 years, the AGEP Community has grown from six graduate students in 2006 and faculty to over **250** participants annually with over **400** alumni nation-wide.

The MSU AGEP Learning Community began with support from NSF, and AGEP has become a self-sustaining component of the matrix of graduate student support provided by the MSU Graduate School. A cross- disciplinary AGEP Learning Community of graduate students and faculty meets monthly; discusses active research by participants using everyday language; and considers current topics of regional and national importance for public policy. AGEP is a proven strategy for diverse recruitment, retention, and persistence in graduate education.

For more information, visit us at:
MSU AGEP website: https://grad.msu.edu/agep
MSU AGEP Program Director: Steven Thomas, deshawn@grd.msu.edu

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Alliance for Graduate Education & the Professoriate — AGEP — Michigan State University

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